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COMPUTERWORLD

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ralian Workers Seeking n Technological Changes

By Susan Coleman
Special to CW

E, Australia — Government agencies planning to install DP ace long delays and may even be denied permission to install their systems if the recommendations of the Australian Public Service Association (Apsa) to the Committee of Inquiry into Technological Change in Australia (CITCA) are implemented.

The Apsa, which represents 36,000 employees in the Australian public service and federal government statutory bodies, is asking that unions with members employed in a work area where a technological change is being considered be consulted before the change is implemented.

Such measures are under consideration or already on the books in several Scandinavian countries.

"Apsa insists upon unions having the right to a significant role in each general step of the process of technological change . . . Unions should be informed at a high level," an Apsa policy report issued in 1978 said.

"Apsa recommends to the committee that it advise departments and authorities that consultation includes the right of rejection of a contempla-

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Users Deferring Orders For IBM Series 30 Citing Price Cuts, 'H'

By Marcy Rosenberg
CW Staff

Betting that IBM will announce its high-end replacement "H" series next year and eventually shave prices on its 3031, 3032 and 3033 mainframes, a majority of users surveyed last week have either canceled or deferred orders for Series 30 equipment.

Eighteen companies agreed to participate in the CW survey, collectively accounting for 25 Series 30 orders including nine 3031s, eight 3032s and eight 3033s.

Of the 25 system orders, 11 have been canceled and four have been delayed for up to one year. Most of the canceled orders — six of them — were for 3031s, followed by four 3032 cancellations and one terminated 3033 order.

Postponements were for three 3032s and one 3033. Some users claimed they have until 12 months prior to shipment to firmly commit to the delivery date; others claimed they have three months.

The remaining 10 customers indicated they are sticking with presently scheduled shipment dates, although several doubt they will actually take delivery. Four of the 10 users had requested and received earlier delivery dates from IBM — mainly for 3033s.

Most of the respondents had placed Series 30 orders when the machines were first announced more than a year ago. They received delivery dates stretching into 1980 and, in some cases, 1981. However, the long wait for Series 30 equipment was not a major factor in decisions to terminate orders. Rather, speculation about the impending "H" series and the rumored Series 30 price cuts spurred most can-

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Earlier Ruling Reversed

Firmware-Based Unit Gets Patent

By Don Leavitt
CW Staff

WASHINGTON, D.C. — At least one example of hardware-based computer facilities including microcoded firmware is patentable material, according to a recent decision by the U.S. Court of Customs and Patent Appeals (CCPA).

In reaching that decision, the CCPA reversed the findings of both the Patent Office and its Board of Appeals, which had ruled unfavorably on the application of John J. Bradley and Benjamin S. Franklin, who were Honeywell, Inc. employees when they initiated their request for patent protection in 1975.

With the invention, system base information can be altered to manage multiprogramming operations without having to reinitialize the system base or use software which takes advantage of the model-dependent properties of a particular computer — techniques which have drawbacks in terms of efficiency.

Bradley and Franklin accomplish their result with a firmware module, consisting of hardware elements permanently programmed with microcode, which directs the data transfers — between scratchpad registers and the system base in main memory — which are necessary to effect the alteration, according to CCPA's description of the invention.

The Patent Office examiner and Board of Appeals had equated firmware with software and then, keying on the presence of firmware in the invention, applied some of the reasoning of U.S. Supreme Court decisions against the patentability of software.

'Erroneous Interpretation'

Writing the opinion for the CCPA on July 5, Judge Giles S. Rich said the examiner's rejection of the application

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Students Save PDP-11 From Blaze

By Tom Henkel
CW Staff

MARYVILLE, Mo. — When fire struck the Northwest Missouri State University's administration building, DP Director Jon Richman was sure his Digital Equipment Corp. PDP-11/70 would be lost.

Nine days later, the system was running at full capacity as a result of the efforts of about 15 students and a DEC account representative who moved the system during the blaze.

The fire started around 8 p.m. July 24 in the attic of the 70-year-old four-story building that housed the computing center. Because the small town of Maryville did not have a hook and ladder fire engine, the fire burned uncontrollably until one could be brought in from a neighboring town approximately 50 miles away. During that time about 15 students, partially protected by football helmets, worked to rescue the PDP-11/70 located on the ground floor.

"They went in to save our disk packs. There was a lot of smoke which would have eventually ruined them. The students also carried out a couple of 600 line/min printers, card readers and terminals," according to Richman.

When the blaze grew worse, students covered the remaining equipment with canvas to prevent water damage.

Firemen battled the fire throughout the night and well into the next day when Tom Sarno, a DEC account representative, arrived on the scene. Sarno was on his way to the university from his Kansas City office on a routine service call when he heard about the fire on his car radio. He arrived at about noon and the fire was "still burning pretty badly."

Civilians Gain Entrance

By 1 p.m. firemen had the fire under control. Fearing the fire would again get out of hand, destroying the Maryville landmark completely, officials of the volunteer fire department allowed students and school personnel to enter the building to save what was left, according to Sarno.

(Continued on Page 8)

Process Could Revolutionize Circuits

By Tom Henkel
CW Staff

LEXINGTON, Mass. — A process that could lead to development of faster integrated circuits, and possibly a three-dimensional silicon chip, is being studied by scientists at MIT's Lincoln Laboratory here.

Scientists — who say their process could revolutionize the way integrated circuits are produced — have succeeded in growing a thin layer of silicon on fused silica (a very pure type of glass). This marks the first time silicon crystals have been grown on a non-crystalline substrate.

The key to the process — called graphoepitaxy — is a series of grooves cut in the glass substrate. A noncrystalline mixture of silicon and water is placed on the substrate and the crystals form when heated by an argon laser beam. Water is then blown off with a nitrogen jet, leaving the newly developed silicon crystal.

MIT scientists Henry I. Smith, M.G. Geis and Dale Flanders — who are working under a $630,000 Defense Department Advanced Research Projects Agency grant — say the graphoepitaxy process allows them to create the silicon crystals, as opposed to waiting for nature to do the job. Silicon crystals are now grown in a long cylinder, similar to a baseball bat, and sliced off, project leader Smith explained.

Another process is used to grow sili-

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Twenty CPUs Handle Orders

Ford's DP Centers Rev Up for 1980

By Tom Henkel
CW Staff

DEARBORN, Mich. — For workers in the automobile industry, 1980 is already here. And for Ford Motor Co.'s Vic Donati, that means a little more work than usual.

Donati manages telecommunications for 22 automotive assembly plants. The commencement of 1980 means those plants have to start gearing down production of 1979 models and gearing up for 1980.

Using a network of 20 data centers, each equipped with a Honeywell, Inc. 6600 series CPU, Donati handles daily orders for 1979 cars, as well as orders for new 1980 models. In addition, the system monitors the number of parts used each day and warns plant officials when supplies are low.

Some companies have already placed orders for some "carry over" — or cars that won't change much — for 1980. Orders for other models that show drastic changes for 1980 — the Lincoln Continental is one such model — will start in a couple of weeks.

"Every year you've got to balance out the cars, whether it changes dramatically or it's just a facelift, because you have to reserialize to an '80 vehicle. In May, we start building up order blanks to the point where we can start dead counting all our parts [or using up the final inventory] before the last unit is built."

When you use between 30 million and 50 million parts each day, that's a complicated job, Donati said.

Processing Orders

Dealing with a high volume of parts, it's impossible to keep an accurate inventory in an on-line mode. Instead, Donati's day usually starts around 9 p.m., when dealer orders start rolling in from the U.S. and Canada. In all, about 15,000 orders come in each night.

First, the orders go to Ford's main DP center in Dearborn, where they are processed on IBM equipment. Once the orders are edited, they are fed to Donati and the Honeywell hardware via magnetic tape.

"I take those orders and do a process called 'exploding' [or summarizing] those orders for material content. I do that centrally with the big IBM computers because they've got the size for it and because it's a monster program. By 11 p.m. I'm finished, and I transmit those orders to the individual plants.

"The plants take those orders and integrate them with the orders they have on hand. They then decrement the orders that were filled the day before and come up with an up-to-date order bank status of where they stand at the beginning of each morning."

"Some companies have already placed orders for some 'carry over' — or cars that won't change much — for 1980. Orders for other models that show drastic changes for 1980 — the Lincoln Continental is one such model — will start in a couple of weeks . . . 'In May, we start building up order blank to the point where we can start [using up the final inventory] before the last unit is built.' And when you use between 30 million and 50 million parts each day, that's a complicated job."

Plants normally hold between 12 and 15 days' worth of orders at a given time, Donati said.

By now it's around 4 a.m., he continued, and the job still isn't finished. Each plant then must run its material inventory programs to see whether it has enough parts on hand to fill the next day's orders.

No Room for Problems

"We carry very little inventory in our plants. The railroads and trucks are our warehouses. In the morning, the computer automatically comes out with critical shortages — what must be replaced within the next 24 hours." Without that information, "there's going to be a possibility of units not being built.

"If you're out of blue trim or facing parts for a 351 cubic-in. engine, [a car is] just as unbuildable as it would be if the mufflers were missing.

"You can work around some problems if you have enough time and your auto bank contains enough orders. But those things take a lot of time, and you try not to subject people to that."

"The 20 data centers are pretty large. I have a Honeywell 6600 in each center. I go from a 6620 all the way up to a 6660, and the number of tape drives, disk drives and memory size varies accordingly," he added.

Some data centers run two plants. Both the Wayne, Mich., and Toronto sites have truck and auto assembly plants adjacent to each other.

"Here in Dearborn, we have a complex called Communications and Data Processing Operations, which is a fairly extensive complex, right next to our world headquarters. It's primarily all IBM equipment," Donati said.

Dealing with two separate systems — the Honeywell system for plant operations and the IBM system for other functions — doesn't present a problem, he noted. "As long as we can talk and communicate between telecommunications centers and plants, it doesn't really matter."

Efficiency is the key to Ford's operation. Each of the 22 plants can only store about one day's production of cars, so each plant must produce only enough cars as there are orders. If too many are produced, a backlog is created, and plant workers are hard pressed to find a place to park the next day's cars.

If too few cars are produced, or production has to be stopped because parts aren't available, orders go unfilled, causing a backup in the production schedule, Donati said.

"Starting in the early evening and through the following morning we update our entire order inventory status and the entire plant system," he added.

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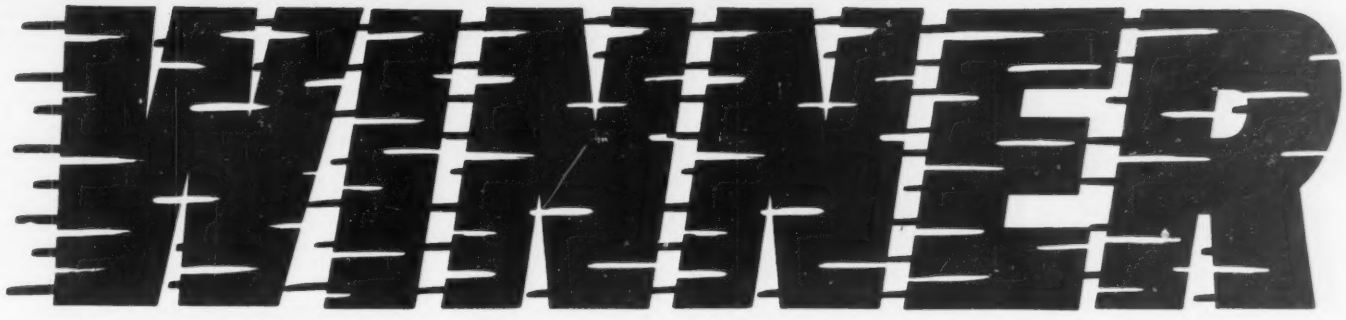
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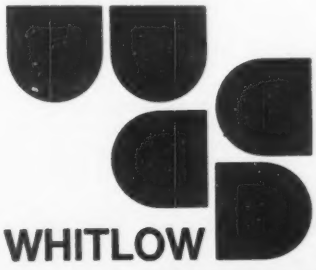
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MIT-Developed Process May Yield Faster Circuits

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con on sapphires. However, to date, that process has only been able to produce polysilicon, or crystals growing in a random orientation, or direction. Polysilicon prohibits stacking silicon chips, according to Geis.

"It's pretty simple," Geis said. "You have a single crystal material on which you put transistors or whatever. Then you can coat the whole thing with silicon dioxide and put another grading (or silicon crystal attached to a substrate) on that." Holes can then be drilled in the two layers of silicon to electrically connect the two, Geis said.

That can't be done now because there is no way to make a second layer of silicon. "The techniques that exist at present (silicon on sapphires) form only polysilicon, or silicon crystals of random orientation. You can't make very high quality devices on them. They're slow, leaky and a very poor quality material, so you wouldn't want to make them into any large circuitry," he explained.

Heat Problems

Although a three-dimensional chip is possible, project leader Smith said the process may still prove inadequate to combat excessive amounts of heat thrown off by such a chip.

"It's highly questionable for heat dissipation reasons. At the current time, microelectronic devices are packed in very tightly on silicon chips, and they dissipate a certain amount of heat. If two or three layers are made, there's going to be even more heat dissipation." Perfection of the process could take up to five years, Smith said.

In terms of cost, Geis said the MIT discovery won't have a tremendous impact on the computer industry.

"The expense is in making the devices, not the material. The big advantage is that you can make devices that you otherwise couldn't or that would be very difficult to make." With the new process, "you can make individual transistors that are electrically isolated from everything else. This has the advantage of having a much higher frequency response, faster system circuitry and lower power dissipation," Geis said.

Mounting Transistors

The team of scientists is now trying to mount a set of transistors on the graphoepitaxy silicon, but to date has only succeeded in attaching diodes to the substance.

"It makes very nice diodes, but we don't have any hard data measurements on it like lifetime measurements and so forth," Geis said.

The process is not without problems, but Geis said they are minor. Uniform growth of silicon crystals stops when the power level of the laser is increased past seven watts. At that point, the silicon melts and starts to flow like hot butter. Geis said this doesn't present a problem because the graphoepitaxy process uses between six and seven watts.

However, one of the most serious problems faced by the scientists has yet to be solved. The graphoepitaxy process produces a silicon layer with a very rough surface. Silicon crystals now in use "are almost anatomically smooth." Geis said the team is now looking into research done by other scientists on polycrystalline silicon to find a way to smooth out the graphoepitaxy layer.

Electronic devices made through graphoepitaxy may also fall victim to soft errors produced by alpha particles penetrating the silicon layer [CW, July 23]. Although the silicon and substrate are pure, or void of radioactive particles that emit the alpha particles during decay, gold and other metals used in building the devices still contain radioactive particles, according to Geis. Manufacturers of polysilicon are now trying to eliminate the alpha particle problems from their products.

Smith said he got the idea for the graphoepitaxy process by watching ice crystals form on tiny, invisible scratches on his car window. That was 10 years ago. Since then, he has been trying to find a way to cut the finely-spaced grooves into the substrate.

Last year, Flanders, one of Smith's students, developed a process for cutting the tiny grooves using photolithography and reactive ion etching.

AFL-CIO Backs Restrictions On DP Exports to Soviets

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — New restrictions on the export of computer hardware and software to Iron Curtain countries were strongly endorsed recently by the AFL-CIO Executive Council.

The endorsement came shortly after the Senate added several limitations to a pending renewal of the Export Administration Act.

The AFL-CIO wants similar provisions adopted in the House, where floor action on export controls is scheduled for early next month; the present legislation expires Oct. 1.

One change OKed by the Senate would give the Defense Department "primary responsibility" for deciding what products should not be exported to the Soviet Bloc. At present, Defense advises the Department of Commerce on such matters.

Computer mainframers have long opposed ceding more export control power to the Pentagon.

"One ironic aspect of the massive buildup of Soviet military might is that it has been aided by profit-hungry U.S. corporations selling America's most critical technology," the AFL-CIO Executive Council said in its recent pronouncement. The council added that "the list of recent Soviet acquisitions is enough to make Lenin's statement that the Western democracies would 'sell us the rope for their own hanging' seem like a prophecy: advanced computers ... policy surveillance devices, seismic equipment ... to name a few."

Quoting recent congressional testimony by the head of the Office of Export Administration, the union said controls on exports of security-sensitive technologies are "a shambles," adding that the office is "overburdened with export license applications" and because it's part of the Commerce Department, its "primary concern is to increase exports."

Computer manufacturers frequently justify the export of advanced systems to the Soviets on the grounds that similar technology is available from other countries. Terming this justification an "excuse," the AFL-CIO said the evidence of foreign availability "often consists of nothing more than an assertion ... by the very firm seeking the license."

Australians Seeking Voice In Technological Change

(Continued from Page 1)

ted change.

"We recommend to the committee that it endorse the principle of consultation on proposed technological change and/or changed work processes being initiated by the employer at the contemplative stage and continuing consultation throughout all stages, including implementation and future monitoring," the report stated.

Apsa said it represented the industrial interests of its members in the Australian government statutory bodies. Its members are in clerical support and fulfill a wide range of other functions.

In the introduction to its submission to CITCA, Apsa claimed that its policy is not one of absolute opposition to technological change, nor is it one of unreserved acceptance.

"Our crucial concern is the way in which technology is controlled and applied in our society," the union said.

Apsa emphasized that, frequently, detailed consultation with unions occurs only after a "firm commitment" to new technology has already been made. "This is partly due to the fact that some departments are able to state that the revised [Public Service] Joint Council guidelines on technological change are only in 'draft' form, and therefore are not binding."

According to Apsa, in the past unions have been notified of changes after management has already made a general commitment to such changes. Minor changes have often not been the subject of consultation at all.

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In Response to Break Offered by ITT

Slew of Firms Proposing Telex Rate Reductions

By Phil Hirsch
CW Washington Bureau

An ITT offer to reduce international Telex rates by 30 cents per minute for customers who pay the domestic access charges themselves has provoked even better offers from two ITT competitors.

The ITT reduction, proposed last month, would apply to three groups of customers: Those who now access ITT switch centers at their own expense via leased private lines; those customers located in the five U.S. gateway cities (San Francisco, Miami, New Orleans, Washington, D.C., and New York) who access ITT through tielines and terminals provided by the company; and those outside gateways who use Western Union Telex/TWX circuits to reach the ITT switch center. (The access charges incurred by this latter group are now paid largely by ITT.)

The first group would receive a 30 cents per minute rate cut beginning Oct. 9 — the proposed tariff's effective date. The others would qualify for the same saving as soon as they agreed to pay all domestic access charges.

A few weeks after ITT's proposal was filed at the FCC, Western Union International (WUI) offered a similar rate reduction. The next move came from TRT, the smallest of the U.S. international record carriers (IRC), in the form of a petition for suspension and investigation of ITT's filing. TRT contended, in effect, that the ITT rate cut was more apparent than real.

An international Telex customer outside a gateway city who reached the ITT switch center via Western Union's Telex/TWX network would pay an average of 32 cents per minute for access, TRT pointed out. Since ITT is currently paying this Western Union charge and is billing the customer only 30 cents more, he would be worse off under the proposed tariff than under the present one, TRT added.

Large Companies Benefit?

TRT said that since these customers tend to be smaller firms that cannot justify leasing private access lines, the benefits of the proposed rate cut would go mostly to larger companies. Furthermore, the large companies, to minimize their access charges, would tend to give all their business to a single IRC.

The company said that since it is the most recent entrant in the market, it is restricted from serving Japan and can receive inbound Telex traffic from a limited number of countries, it would be placed at an enormous competitive disadvantage. "This . . would be a major loss to the public," TRT stated. "In recent years, rate competition in international Telex service has almost entirely been provided by TRT, [which] has also been a leader in the introduction of service initiatives."

TRT then proposed its own rate cut. For subscribers outside the gateways, the terms would be the same as those proposed by ITT. But TRT offered to give its tieline customers a 30 cents per minute rate cut without requiring them to assume the access line charges.

If all U.S. IRC's adopt this arrangement, present international Telex rates will be reduced $20 million a year, TRT claimed. The company said ITT's proposal, in comparison, would save users $6 million a year.

Shortly after TRT's announcement, RCA came in with still another plan. This one offers most international Telex subscribers a 55 cents per minute rate reduction if they pay the access charges, while those users requiring nonstandard speeds or formats would pay 30 cents per minute less.

A Federal Communications Commission spokesman anticipates a decision "sometime in October."

Conway Heads Century Data

STAMFORD, Conn. — James N. Conway has been appointed president of Century Data Systems, Inc., the Xerox Corp. subsidiary that develops, markets and manufactures low-cost disk drives for OEMs.

Conway succeeds Thomas L. Skelly, who was acting as general manager at Century Data since James Y. Payton, Century Data's former president, was fired by Xerox in June. Payton was reportedly dismissed because he opposed efforts to unionize Century Data [CW, July 23].

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N.Y. Panelists Discuss Coping With Computers

By Connie Winkler
CW Staff

Some generals wired two computers together and asked the system, "Is there a God?" The computers answered back: "Insufficient information."

The generals wired all their computers together and asked, "Is there a God?" The answer came back: "Insufficient information."

All the military powers in the world hooked their computers into the same network and the generals, holed up on Mount Olympus, asked yet again, "Is there a God?"

The machines chattered, and there was a long pause before the computers printed: "There is now."

WHITE PLAINS, N.Y. — This story, which calls to mind the menacing computer Hal in "2001: A Space Odyssey," was one disquieting answer to a simple enough question: How can we cope with the computer?

That was the topic of discussion at one of a weekly series of events being held in connection with a computer art exibit at the Westlake Gallery here.

"I really believe that's what is going to happen — that through some absolute accident there is going to be independent action by computer networks that will have disasterous effects," Robert L. Brass, director of business systems analysis at Xerox Corp., stated.

Stunned by Possibilities

Brass, who told the above story, said early in his career he was stunned by what can happen when two computers are connected. He was at Bell Telephone Labs at the time, where he designed the first electronic signal switching device and someone else designed the central control.

When the switching device was connected to the control, the entire system started doing things neither Brass nor the other engineer understood. "It was doing something neither one of us had designed it to do," Brass said.

When computers are hooked together, information can be created, transmitted, distributed and stored without involving a human being in the process. There is no censorship and there is no quality control, Brass noted.

Computers are being tied together in communications networks at such a break-neck speed that in 10 years most communications will be computer-initiated and will take place between computers, Brass said.

Consider what would happen if the computer monitoring the voice recognition listening device on your telephone were connected to a computer controlling your electric power.

"Suppose," Brass said, "the computer has a few schizo thoughts monitoring certain words and you say the wrong thing about the electric company. Off go your lights. It sounds funny, but these things could happen."

Brass also suggested that when computers start communicating more, what we define as intelligence is going to change. Fifty or 100 years from now, sociologists will point to the networking of computers as the turning point.

"Do computers have judgment? I don't know," he continued. "I do know that they are getting smarter, doing things we don't expect."

In 1978 a computer beat a master chess champion, and the reigning checkers player is also a computer, he said. The chess computer wasn't given rote moves; it was only given the rules and the elements of the game. And while the checkers computer doesn't win everytime, it learns from its mistakes quickly.

Establishing Symbiosis

The other three panelists were more conciliatory and optimistic about man's ability to cope with the computer.

There has to be a symbiosis between man and the computer, according to Carl Machover, a computer graphics consultant in White Plains and the curator of the computer art exhibit. People are creative, but relatively slow; computers are not creative, but they are fast and make few mistakes. The two need to work together, he said.

"There's a public feeling that monolithic, giant computers are taking over the world," Machover said. "People are very much in control. In order to remain in control, however, they need technology."

Because computers will soon be programmed in English, Randall Hitchens, an industrial engineer at Nestle Enterprises here, rejected the idea that lay persons will have to learn computer languages.

"Once we make the computer understand English we will never have to cope with the computer. It will have to cope with us," Hitchens remarked.

The computer buff said computers are becoming more pervasive as they become smaller, cheaper, more powerful and more "friendly." At Nestle, I'm beginning to see an interface between programmers and systems people — there are no longer the nitty-gritty problems of making the computer work.

"The fact we are in an art gallery is a statement of that flexibility."

Bright Ideas

"The computer is exactly as smart as your light switch on the wall," remarked Laura S. Hawks, who urged both a non accepting and accepting attitude toward computers.

"It is not the computer that is at fault. It is the people who have decided what kind of customer service to provide and on what basis to do things with the computer," Hawks said about mistakes in computer billings.

When businesses say the computer made the error, that's as ridiculous as saying, "My car brought me here half an hour late," she continued. Hawks, a former IBM systems engineer, is now branch manager of Heights Information Service, a software firm in White Plains.

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(Continued from Page 1)

was "grounded on the erroneous interpretation of the Supreme Court's decision in [the Benson-Tabbott case], namely, that all computer program or program-related inventions are non-statutory.

"Both the Supreme Court and this court have thoroughly repudiated this view," Rich added.

With that, he addressed the analysis made by the Board of Appeals and found it too was faulty. The board "regarded the fact that digital computers operate in some number radix as conclusive on the issue of whether the [Bradley/Franklin] claims recite a mathematical algorithm in the [Benson-Tabbott] sense."

But the board did not identify any specific formula it thought was utilized, or to what, if anything, the mathematical calculations alleged to be present in the claims were directed, the judge noted.

"Such reasoning leads to the conclusion that any computer-related invention must be regarded as mathematical in nature, a conclusion which is not compelled by [Benson-Tabbott], he commented.

The opinion in the Benson-Tabbott case, decided in 1972, held that software that had as its sole purpose the solution of a mathematical algorithm was not patentable under the U.S. code.

In Bradley/Franklin, the appeals board's analysis "confuses what the computer does with how it is done [but] what is of importance is the significance of the data and [its] manipulation in the real world," Rich added.

The computer may be performing a mathematical algorithm and solving an equation as in the Benson-Tabbott case, he acknowledged.

"On the other hand, it may be that the data and the manipulation performed by the computer, when viewed from the human level, represent the contents of a page of the Milwaukee telephone directory. Such information is utterly devoid of mathematical significance," Rich commented.

Rich went on to note that Bradley and Franklin had characterized their combination of hardware as a mechanism to alter information in a way not previously possible. "They are in no way claiming the altered information [as an invention]; in fact, the particular information acted upon by the . . . invention is irrelevant to the operation of the invention itself."

If Bradley/Franklin were claiming the information embodied in the firmware or the firmware itself, per se, a different case would be presented, Rich said.

"We disapprove the board's distillation of [Bradley/Franklin's] claim down to the information contained in the firmware in order to hold it nonstatutory. The invention was claimed as a machine and "we see no reason to view the claim format as a subterfuge."

The Patent Office, normally through the Solicitor General's staff, has 90 days in which to seek a Supreme Court review of the CCPA decision. By midweek last week, nearly halfway through that time period, no request for such a review had been forwarded to the part of the Solicitor General's office that would have to act on it.

No One Was a Loser

SUNY System Keeps Score for Special Olympics

By Tim Scannell
CW Staff

BROCKPORT, N.Y. — Recently, thousands of the best athletes from around the world converged on this small college town to test their skills in a three-day computer-tracked competition. At the end of the event, everyone was awarded a medal or a ribbon, and nobody was a loser.

The prize-winning athletes were participating in the International Special Olympics, a series of games sponsored by the Joseph P. Kennedy Foundation for handicapped children and adults. Hosted this year by the State University of New York (SUNY) College at Brockport, the contest involved approximately 3,500 olympians from all over the U.S. and more than 20 foreign countries. An additional 1,500 chaperons accompanied the athletes on their sporting trek, and 5,600 volunteers managed the crowds at a stadium specially constructed here for the event.

Memory Added

The games, ranging from track and field events to basketball, soccer and swimming, were scored with the school's Prime Computer, Inc. Model 400, normally used by the faculty for instruction and research.

To allow for extra sports-oriented load, Prime donated 256K bytes of memory, boosting the systems's capacity to 1M bytes.

"I have never seen such a massive effort by this college in all the 12 years I've been here," Norman Plyter, director of the university's computer center and head of the Olympics' DP operation, said. "It was worth it to see the love and affection those kids had for each other and for all of us."

Participants in the games are selected from annual local and state competitions and represent the cream of their athletic crop, Plyter explained. Contestants must be 10 years old or older; the oldest person at this year's Olympics was 62.

Writing the Software

While the international event traditionally draws tens of thousands of spectators and involves a variety of sports, computers have never been used interactively to score the competitions.

Plyter wrote his own software on the university's computer to accommodate Brockport's Olympic games.

"There are existing programs that were written at Indiana State University eight years ago," but "they consist of 12 Cobol programs that are purely batch-oriented," Plyter noted. "We elected not to use those programs and to go on to an interactive data base system, giving us the flexibility to add new systems and enter our data very rapidly."

Plyter's sports software is actually a tri-leveled system that maintained a listing of all the athletes and their scores and handled the registration and assignment of the thousands of volunteers to more than 80 different game committees. It also kept track of more than $1 million in cash donations.

While the old software could have processed the scores for the competition, it couldn't perform any kind of analysis or coordinate administrative functions like the interactive programs could, Plyter added.

"For example, the local newspaper here got a call from Guam. They wanted the names of the Guam athletes and where they finished. So, while I was sitting here at my desk, I dialed up Guam on the CRT, read the names [to the reporter], and he is now sending the information by teletype to Guam," the DP head stated.

Contending With Rain

Although the games themselves went smoothly and Brockport managed to survive the onslaught of spectators, problems — in the form of thundershowers — plagued the first day of the event. As athletes dashed across the track field and judges carefully noted their progress, a number of score sheets were soaked in the pouring rain.

"Some of the score sheets or field reports . . . got wet out there, and it was very difficult to read the scores as they came back in," Plyter observed. "We dried them off, and sometimes we simply held them up to the light to read what the pencil impressions were." The scores were then keyed into a CRT.

In all, it took about eight hours to enter and process the more than 6,000 scores, although it still wasn't determined at press time who would wear the Olympic crown. "Every athlete managed to get a medal of some kind," Plyter said. "We're still counting who got the most gold medals."

It is the spirit of personal achievement and not competition, however, that is the driving force at the games. "Everyone runs or swims as well as they can and does the best they can, and the accomplishment that these kids feel in just doing that is spectacular," Plyter remarked.

"When a kid falls out of a wheel chair, gets up and pulls himself back into it and then rolls on to come in last and still has a big smile, it's just a thrilling event."

New course

To COBOL programmers: How $15 can make you more valuable

We all know that there's a big difference between the programmer who has had ten years of experience and the programmer who has had one year of experience ten times. Unfortunately, the second class of programmer is all too common. It seems once a programmer starts to do production work, he has little time to learn anything new. So he uses what he already knows, year after year, even though a little extra training could make him that much better at his job.

If you're a COBOL programmer who's ready for that "little extra training" that can make you more valuable, then we've got the book for you. It's called *Structured ANS COBOL, Part 2: An Advanced Course*, and it teaches an average programmer to use COBOL the way the best senior programmers use it.

What does the book cover?

Because we feel that all modern shops should develop programs using the techniques of structured programming, this book shows you how to develop programs using structured design, structured module documentation, and structured coding. In fact, chapter 1 is a crash course in structured programming.

The remaining chapters cover the language elements that are either misused or *not* used by the average COBOL programmer. For instance, chapter 2 shows how to code table-handling routines using indexes, the SET statement, and the SEARCH statement. Chapters 3 and 4 cover the COBOL language you need when you want to use the CALL and COPY libraries. Chapter 7 covers the SORT and MERGE statements and shows how to write COBOL sort or merge programs so they can be executed in a controlled way from start to finish. Chapter 9 shows how to process indexed files using (1) the 1968 IBM COBOL elements and (2) the 1974 standard COBOL elements. And there are also chapters on character manipulation and the debugging verbs.

Beyond the COBOL considerations, the emphasis in every chapter is on *practicality*. The table-handling chapter, for instance, doesn't just teach the ANS table-handling elements. It also explains why it's more efficient to index a table than to subscript it, when to use a binary search rather than a sequential search, and how to break complex, multilevel tables down into one- and two-level tables that are easier to handle. The chapters on the COPY and CALL libraries don't just explain the COPY and CALL statements. They also show how and when the libraries should be used in developing structured programs. The sort/merge chapter doesn't just present the COBOL SORT and MERGE verbs. It also shows alternate ways to sort or merge records that are processed by a COBOL program. In short, you won't just learn advanced COBOL elements from this book. You'll also learn how to use these elements in the most efficient, most practical way possible.

Do I need other reference manuals?

Structured ANS COBOL deals primarily with a subset of standard COBOL that will run on either a 1968 or 1974 compiler. However, it is specifically designed for users of DOS or OS on the IBM System/360-370 (or the Series 30). In particular, it presents a programmer's subset of DOS and OS JCL along with the important IBM extensions to standard COBOL. In general, then, you can learn DOS or OS ANS COBOL using this book alone.

If you're not an IBM user, you will probably want to supplement this book with reference manuals for your system. No matter what system you're using, though, you'll find this book useful because of its emphasis on standard COBOL. With only minor modifications, any program shown in this book will run on any system that has a standard COBOL compiler.

If this is part 2, what happened to part 1?

Part 2: An Advanced Course is the second part of a two-part course in structured COBOL. *Part 1: A Course for Novices* is designed to teach a beginner the skills he needs to become an entry-level programmer in industry. In terms of COBOL, this book teaches a professional subset that includes sequential file handling on tape or direct-access devices. And, like part 2, part 1 teaches practical, structured-programming methods of design, documentation, and coding. So a beginner will learn how to develop structured programs as he learns COBOL.

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Users Deferring Orders of Series 30 Equipment

(Continued from Page 1)

cellations and deferrals.

One milling company, for example, said it would not pay current Series 30 prices, but expects the price of its 3031 to be halved by the time the system is ready for delivery in June 1980, a spokesman said. Until then, the firm will make do with its 370/145 and 148.

A number of other customers did give up on 3031 orders, but only after evaluating IBM's 4300 — even though this processor line was not designed as a Series 30 replacement. The aggressive pricing and performance of IBM's newest computer series led to the termination of four 3031 orders in favor of 4341s.

One user plans to substitute two 4341s for one 3031, while two users opted for a one-for-one exchange, despite the fact that their 4341s will not arrive until at least one year after the scheduled 3031 shipment date.

"The wait will be worth it," remarked James Stephenson, DP director at Western Michigan University. The university will take delivery of a 4341 in the third quarter of 1981 — more than a year after its 3031 was slated to arrive.

The university originally planned to lease a 3031 until the 4341 was available but decided two conversions would be too rough to handle, Stephenson said. So Western Michigan will muddle through with its 370/-148 until the 4341 is delivered.

Even those users sticking with their Series 30 orders are determined to keep their options open. Few are purchasing the machines; instead, they are asking for month-to-month rentals or short-term leases, often from third parties.

A major greeting card company, for one, scrapped plans to purchase a 3031, claiming it would not accept the machine at present prices. As an alternative, the firm will rent the mainframe on a short-term basis while it waits to see what new products IBM or other vendors will have to offer.

Other customers, like Boston University, have deferred Series 30 orders and turned to the used IBM 370 computer marketplace for cheaper solutions to interim needs. The university pushed its 4M-byte 3032 shipment date ahead one year from August 1979 to August 1980, at which time it still won't take delivery.

"We're looking forward to the 'H' series and didn't want to commit to the 3032 for more than two and a half to three years," John Porter, assistant director of the academic computing center, explained. Plans are to lease a used 4M-byte 370/168 from a third party for a 30- to 36-month term as a temporary measure.

Indeed, Porter and others regard the 3032 as merely a "reengineered 168." A DP manager at a major airline, which installed a 3031 on a short-term lease last October, found the system "wasn't much different from a 370/158" and removed it early this year. The company plans to get by with three 158s and may rent a fourth until the "H" series is announced.

Few to Migrate

Despite plans to shelve Series 30 orders, few of the users surveyed will migrate from the IBM umbrella either for ultimate 370/148 and 158 replacements or for temporary upgrades. Many are locked into IBM software and can't afford the cost of converting to other vendors' systems.

Blue Cross of Louisiana, for example, recently canceled a 3032 order to wait it out for the "H" series. "We did not consider any non-IBM alternative systems because we are heavy into IMS and would require too many software changes to convert," Sam C. Theis, system software specialist, maintained.

"We've been burned on service from software-compatible vendors because of our location in Baton Rouge," Theis said. "IBM, with a large number of customer engineers in our area, offered better service than software-compatible vendors with service only from New Orleans."

To solve immediate needs for additional computer power, the firm has upgraded its 370/158 by installing an attached processor and by adding memory.

Most users who tabled plans to acquire Series 30 machines are not concerned about future availability should they decide to reorder the machines. Perhaps as an indication of sagging order rates, industry sources claimed that delivery schedules on Series 30 equipment are shrinking, dropping from 24 months last May to 12 months in mid-July, when availability time was as short as four to five months.

In fact, Boston University's Porter claimed his IBM salesman quoted 30-day turnaround on 3032 machines. This was confirmed last week by an IBM spokesman who stated that, while the company cannot commit any equipment to anything less than a 12-month delivery, "it is conceivable" that a user could obtain a 3032 in one month, a 3033 in four months, and a 3031 in five months.

CW survey by Tom Henkel, Marcia Blumenthal and Marcy Rosenberg.

Missouri Students Rescue PDP-11/70

(Continued from Page 1)

A Maryville fire official said civilians were allowed to enter the burning building because the fire was restricted to the top two floors. The official said university personnel wanted to go into the building, and he didn't see any reason to stop them.

Small fires were still burning when Sarno entered the building. "We couldn't use the door closest to the computer room because that end of the building was leaning out and chunks of masonry were falling on the outside of the building. I asked for a forklift and a truck, but the floor was too buckled to get a forklift in.

"The water in the computer room was three or four inches deep, and it was deeper in the halls where the floor had buckled," Sarno continued. "I had to get guys with squeegees to move the water back long enough to roll the disk drives through, or else the water would have been deep enough to get into the main bus connection, and I didn't want to have those headaches."

Sarno and several school officials worked for the next five hours disconnecting and removing equipment. They were preparing to remove the last two pieces — the CPU and expander box — when another fire broke out right above the computer room. At that point, fire officials ordered the workers to evacuate the building.

Evacuating the CPU

"We evacuated by rolling the CPU and expander box down the hall with us. Just as we went one way, firemen were dragging hoses the other way. Then they just washed everything away," Sarno recounted.

"I was happy to [roll out the CPU], because I knew if I moved it, it would be easier to bring back up. It had to be completely reassembled and recabled. Head alignments from disk drives had to be set and all the filters changed.

"There was no damage at all; the only parts I replaced were the filters on the cabinets and disk drives, and I cleaned everything very well," Sardo added.

In the aftermath of the fire, Richman noted, "we were a bit behind in our production schedule, but we got the grades out on time for the summer semester. Right now we're about two days behind."

Although the PDP-11/70 came through the ordeal without a scratch, an outdated IBM 360/130 — which the university had shut down a week earlier — wasn't so lucky. That system suffered heavy water damage, "but I don't think anyone really cares. It's just not worth anything anymore," Richman said.

The city's water bills, ordinarily processed at the university facility, were also destroyed in the fire. As a result, city workers were forced to send out hand-prepared bills from a master roster that had been prepared at the university the Friday before the fire. The saving grace of the whole ordeal was the university's distributed processing hookup with the University of Missouri in nearby Columbia, Richman said.

"When the fire was at its worst, I thought how nice distributed processing was. At least I was going to save about 70% of my terminals, and all our data was stored at the University of Missouri. We're hooked up as a remote job entry station to an Amdahl Corp. 470/V7," Richman said.

Although it saved much of the data, and possibly some hardware, the distributed system did present some problems. Fire destroyed the university switchboard, which knocked out telephone communication for several days. When phone service was restored, the computer center was restricted to one telephone line.

A private line to DEC's diagnostic link was also destroyed. That line has yet to be repaired, Sarno said.

Richman said he's not taking any chances in the future. The VAX 117/-80 system the university has on order to round out the distributed processing system will be located in either the renovated or replaced administration building. But just to be on the safe side, the PDP-11/70 will stay in its new location in the Garett-Strong Science Building.

"We'd like to have our eggs spread out for the next one," he said.

The blaze, which did an estimated $3 million worth of damage to the administration building, was blamed on faulty wiring in the building's attic, Richman said.

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In U.S. vs. IBM

Justice Lawyers Blast Edelstein Bias Charges

By Connie Winkler
CW Staff

NEW YORK — IBM does not have legal cause to bump Judge David N. Edelstein off the U.S. vs. IBM antitrust case, the government said in its response to IBM's charge that Edelstein is biased against IBM.

IBM asked Edelstein to take himself off the case and appoint a new judge to the 10-year-old case on July 19, and the first formal part of the government's response was filed here recently.

"The Affidavit is infirm for untimeliness and legal insufficiency," the government said in its 13-page memo. Legally, a petition to have a judge removed from a case must be filed before the trial begins or only after showing good cause, the Antitrust Division's trial team wrote.

In this case, however, IBM urged the assignment of Edelstein to this case. Further, IBM "complacently soldiered through three years of pretrial proceedings and more than four years of trial before its alleged dissatisfaction with the Chief Judge's rulings and comments precipitated second thoughts."

The type of bias or prejudice necessary to require recusal must be personal in nature and extrajudicial in origin, the government stated. "The asserted partiality cannot be bottomed, per se, on a judge's discharge of judicial duties in the course of litigation," the response said.

'Misleading' Documents

IBM's petition was accompanied by affidavits from lawyer members of IBM's board of directors and by 10 volumes of citations from the 90,000-page transcript. However, in none of this material can the factual assertions be found that would permit the interference of an extrajudicial source for the claimed bias, the government said.

In fact, the memo said, "IBM's affidavit misleadingly recounts events by eliding facts and background necessary for an impartial evaluation of the allegations of personal bias against Chief Judge Edelstein."

The Justice Department found that the "overwhelming" bulk of the transcript described "normal, temperate judicial conduct" that cannot be questioned either under statutes or under the Constitution. (IBM has argued that Edelstein's bias offends its Fifth Amendment right of due process.)

In its papers IBM said Edelstein, as evidenced by his rulings so far in the case, has "a bent of mind that will prevent impartiality of judgement."

The government counters that this IBM ploy is insurance against unfavorable future rulings by Edelstein. The surprise IBM petition came after Edelstein's June 25 ruling that the giant computer maker turn over to the government numerous documents in connection with the testimony of IBM chairman Frank T. Cary.

IBM said it did not raise the bias and prejudice assertion until now because of self-doubts. However, self-doubt can be easily contrived, responds the government's "Memorandum in Opposition to IBM's Affidavit Seeking to Recuse Chief Judge Edelstein."

On Aug. 27 the Antitrust Division is expected to respond in greater detail to the 2,000 pages of citations from the trial record allegedly showing Edelstein's prejudice. In this first legal brief, however, the government said IBM took these instances out of context.

"IBM's selection of material to substantiate its claim of bias or prejudice was misleading and colored with advocacy."

IBM only looked at a small portion of the total record, the government said. "The Government submits that the record as a whole, far from exhibiting intemperate or prejudicial conduct on the part of the Court, reflects an honest and fair stewardship over this toilsome proceeding."

When the judge does get irritated, the government said, it's because he's impatient with the conduct of the witnesses and lawyers "during long and bitterly fought proceedings."

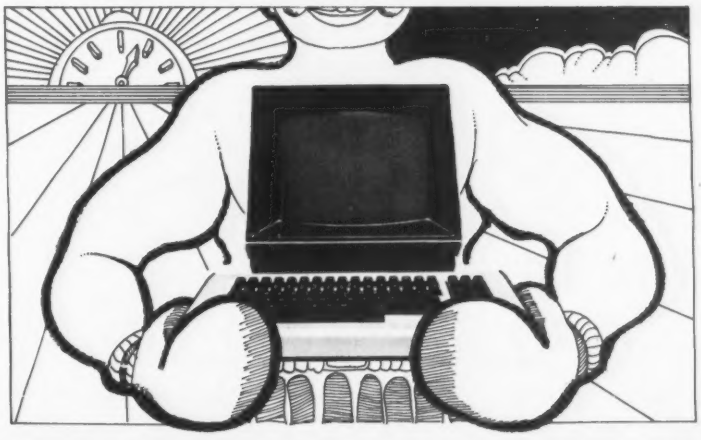
IBM's statements "depict no pattern of bias, but fleeting judicial irritation midwifed by an arduous and combative trial where the stakes are monumental," the report said about the judge's minor deviations from standard judicial conduct.

The trial has been adjourned until Edelstein rules on the petition to unseat himself after sitting on the case for seven years without a jury. It's uncertain when he will make a ruling, because August is traditionally a vacation month for the court.



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Correct Lease Prices For IBM 3031, 3032, 3033

WHITE PLAINS, N.Y. — New lease prices for the IBM systems 3031, 3032 and 3033 with increased memory capacity were incorrect as published last week, according to IBM, whose spokesman supplied corrected figures this week.

The 3031 Model 7 with 7M bytes will lease for $36,730/mo on a four-year lease, and the 8M-byte version will lease for $39,500/mo.

The 3031 attached-processor model with 7M bytes will lease for $37,170/mo, and the 8M-byte attached-processor will lease for $39,940/mo.

Finally, the 8M-byte version of the 3032 will lease for $57,030/mo on a four-year plan, IBM said.

Rental plans are also available.

ACM Taps Paul Mirabito To Keynote '79 Meeting

DETROIT — Paul S. Mirabito, chairman and president of Burroughs Corp., will be the keynote speaker at the 1979 Association for Computing Machinery (ACM) Annual Conference Monday, Oct. 29.

The conference, which will be held here Oct. 29-31, will include 26 panels and paper sessions with more than 100 speakers in "every area of computing," according to ACM.

Mirabito was elected to the board of directors of Burroughs Corp. in 1968 and became chairman of the board, president and chief executive officer in January 1978.

Additional information on the ACM conference may be obtained from the conference chairman, Mayford L. Roark, Room 895-WHQ, Ford Motor Co., The American Road, Dearborn, Mich. 48121.

Grants Available For Iamacs Meet

MANHATTAN, Kansas — U.S. scientists interested in attending the International Association for Mathematics and Computers in Simulation (Iamacs) Congress on Simulation of Systems in Sorrento, Italy, Sept. 24-28 may apply to Kansas State University for round-trip travel grants.

Preference will be given to authors of papers submitted to the congress. More information is available from Dr. Virgil Wallentine, Computer Science Department, Kansas State University, Manhattan, Kan. 66506.

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NCR, Cable Gear Maker File Final Papers in Suit

By Marcia Blumenthal
CW Staff

NEWARK, N.J. — When Edward S. Chatlos decided to automate his parts inventory system in 1974, he never dreamed that five years later the computer he bought would be sitting unused in the corner gathering dust or that his firm would be embroiled in a lawsuit with a billion-dollar computer company.

But contrary to Chatlos' expectations, that's exactly what happened. Chatlos Systems, Inc., a manufacturer of cable pressurization equipment, has just rested its case against NCR Corp. in U.S. District Court here. NCR has also submitted its final arguments in the case, which during the past two months has been tried without a jury before Judge Lawrence A. Whipple.

Among the issues presented in the case, Chatlos' law firm, Kalb, Friedman and Siegelbaum, has charged that NCR misrepresented the capabilities of its 399 system, which was outfitted with a 656 disk subsystem, in order to prevent Burroughs Corp. from taking the Chatlos sale away from NCR.

Moreover, the attorneys argued that, in making the sale, NCR acted fraudulently because it did not inform Chatlos that it was using the firm as a test site and that 40% of test site installations fail to perform as expected.

Chatlos is seeking damages of $444,926 and additional punitive damages from NCR.

NCR has denied all of Chatlos' charges, conceding only that Chatlos is entitled to recover $35,152 to cover the costs of replacement programming.

Two Choices

According to court documents submitted by Chatlos, the firm originally decided to buy an NCR 399 magnetic ledger card system, which NCR sales represetatives Sam Long and Michael Barry determined was the best system for Chatlos' needs.

Chatlos wanted a system to perform six applications including accounts receivable, payroll, order entry, New Jersey sales tax, cash receipts and, most important, inventory deletion. The firm had found that it could not keep track of its inventory of parts and had capital tied up in unnecessary parts. At the same time, it was out of stock on other parts, resulting in high backlogs.

While looking for an appropriate system, Chatlos also talked with some Burroughs salespeople, who persuaded Chatlos that a B700 system with disk storage would be the best one for the company.

Chatlos indicated interest in the Burroughs system to NCR salesmen Long and Barry, who then told Chatlos the 399 would run with an NCR 656 disk system and would also be the right system for the company.

According to alleged internal NCR documents discovered in the course of the trial, NCR considered itself engaged in corporate warfare with Burroughs. Furthermore, the firm was worried that Burroughs would lure away potential customers unless NCR could demonstrate a successful 399 system with disk.

To clinch the sale, Long told Chatlos that in July of 1974, NCR had 30 to 40 399/656 installations, and that such a system could be up and running at Chatlos within six months of the signing of the order agreement, according to court documents. Chatlos purchased the system in July of 1974 for about $70,000 and also agreed to buy a service contract for 51 months at $110.22 a month.

At the time Long made those statements to Chatlos, NCR only had three or four other 399's installed with disks, and these were all test sites, according to Chatlos' post-trial brief.

Moreover, Chatlos claimed that NCR knew that Chatlos' applications would require the programming of multiple records per sector and that the system's operating software would not be ready for this until late 1975.

In addition, Chatlos alleged that NCR knew its programmers were having great difficulty with the 399/656 disk system, requiring the encoding of multiple records in a sector.

During the trial, using NCR documents and NCR witnesses, Chatlos' attorneys attempted to establish that Chatlos was never told it was serving as a test site for the evaluation of an NCR inventory control system.

Charges Countered

Countering Chatlos' charges, NCR claimed it had completed its control site program for the 399/656 disk system in September 1974, three months prior to installing the system at Chatlos. Therefore, NCR did not need to designate Chatlos as a control site.

In fact, NCR claimed two of its four test sites had used multiple records in a sector and, by the time the system was delivered to Chatlos in December, 30 such systems had been delivered to customers.

NCR further argued that Chatlos knew the 399/656 system was new to NCR's product line and would require more programming and modifications before final installation. NCR contended it never promised Chatlos the system would be up and running within six months of the taking of the order, but rather that the system would be delivered within that six-month time frame.

To get the system up and running required the assignment of six different programmers and analysts at various times, because all programs other than payroll were custom programs. The system was ready for demonstration to Chatlos in February 1976, NCR claimed.

After the demonstration in March 1976, NCR said it requested Chatlos to perform several functions, including the conversion of the inventory information into the computer so the final installation could take place.

NCR said that Chatlos did not cooperate with NCR's requests and never asked for further demonstrations of the equipment or additional information. Instead the company refused to allow NCR to install the equipment in September 1976.

Although the packaged payroll program was allegedly the only program ever run on the system, Chatlos stopped using the system in October of 1978.

Judge Whipple is currently reviewing the arguments and is expected to make his decision within the next few weeks.

Survey Cites Decline in DP Students' Ethics

By Marguerite Zientara
CW Staff

LONDON, Ont. — University students recently surveyed demonstrated a notable increase in unethical computer use compared with a group surveyed a year earlier, according to a professor of computer science at the University of Western Ontario here.

The findings came from two similar surveys of about 70 students each in the advanced information systems course here, conducted by Prof. John Carroll. In addition to teaching at the university, Carroll has written several books about computer security.

The surveys, conducted in 1978 and again in 1979, each consisted of more than 10 questions concerning the school's teaching computer and resulted in the following admissions of guilt (the answers in parentheses indicate answers given by students in 1978 survey):

- Twenty percent said they had deliberately tried to crash the computer.
- Thirty-four percent said they had tried to obtain computer time without paying (9%).
- Thirty-four percent said they had tried to penetrate the security system (6%).
- Twenty-four percent said they had used someone else's password that they had learned by accident (6%).
- Twenty-eight percent said they had tried to harass other users (5%).

It should be noted that the teaching computer in question "contains nothing worth stealing," according to Carroll. It is not used for financial records or other sensitive data.

Carroll added he didn't know if student attitudes would have been different if the computer involved had contained valuable information.

'Worrisome' Findings

Nevertheless, Carroll found the large percentage increases between the two surveys "worrisome". He noted, however, that the increase may have been a result of the fact that the first survey more obviously related to ethics and "this may have put [the students] on their guard."

In addition, the 1979 survey also contained technical questions and the students therefore may not have realized that the point was to probe ethical attitudes, Carroll noted.

While the surveys involved only a tiny sampling of Canada's computer science students, Carroll is concerned that the results may be indicative of a larger trend in the DP community, not only in Canada but in other countries, as well.

"The main problem is that we haven't pointed out [to students] some of the major shortcomings in our system, and we've never told these people what's right and wrong as far as using a computer goes," Carroll said.

The fault, Carroll maintained, lies largely with academicians, who are "very hostile" toward the idea of teaching computer ethics in university classes.

"Quite readily the academicians see that computer science is a pretty complicated subject today, and they are unwilling to admit to the curriculum what they consider to be 'soft' courses," Carroll observed.

"They'd rather have someone studying compiler construction or the theory of computability than studying ethics," he added.

Second, Carroll said, academicians "somehow interpret this as a limitation on freedom for the students and professors as well." He cited the typical operating systems course assignment of attempting to break a system's security.

'Learning Experience'

"This [assignment] is generally conceded to be a good learning experience," Carroll said, even though the act itself is dishonest. That kind of assignment "certainly has proved to be a mistake," Carroll added, citing the three University of Alberta students who were criminally charged with penetrating and manipulating that school's data files last year [CW, June 26, 1978].

While such assignments may involve dishonest actions, they are also challenging to the "better" students, Carroll concluded. In his second sur-

(Continued on Page 12)



Lessens 'Fear' of Technology?

Art Show Features DP Weavings, Sculpture

By Connie Winkler
CW Staff

WHITE PLAINS, N.Y. — The medium is truly the message at a computer art exhibit here at the Westlake Gallery.

It's a fun display of intense lines, bright acrylics, geometric weavings and a formica sculpture designed especially for the show and gallery.

"People can understand computer functions through an exhibit like this in ways they can't from programming or being reduced to a bank number," explained Cathy Westlake, who operates the gallery.

She noted the exhibit of drawings, graphics and sculpture is particularly appropriate to this suburban New York City community, which headquarters IBM's mainframe Data Processing Division and dozens of corporations dependent on computers.

Because society, through the influence of television, is so visually oriented today, Westlake finds the exhibit has been particularly effective in portraying what computers can and cannot do. It certainly helped her cope when a bank computer recently snarled her checking account, Westlake said.

The exhibit was pulled together by Carl Machover, who heads Machover Associates Corp., a computer graphics consulting firm in White Plains. Machover got the idea for the exhibit while collecting art for his new office.

"I have a strong feeling the public is unduly frightened by technology," Machover said. "Technology helps. I felt it was worth bringing the public's attention to applications of technology [involving] something other than the frightening, the threatening. All the pieces are there because they're art."

" 'I felt it was worth bringing the public's attention to applications of technology [involving] something other than the frightening, the threatening. All the pieces are there because they're art.' "

Computer art shows have been concentrated in the technical community for the last 10 years. Now, Machover said, several of his colleagues are approaching local galleries to set up the kind of show being presented in White Plains.

When Machover approached Westlake with the computer exhibit idea, she was indifferent. "My basic reaction was one of total horror. All I could think of was kids with typewriters making pictures with X's and O's," Westlake recalled.

Once Westlake saw the art, she quickly became a computer art enthusiast. She is pleased the exhibit has sold well and has been accepted by the community.

The show has also prompted the perennial question whether computer art is art or design.

"I don't agree that it's design," Machover said. "I think the computer is able to add that random factor." He pointed to exhibit pieces that are not sheer repetition. Many artistic accidents occur in art, according to Machover, who said playfully, "Look at how Jackson Pollack made use of gravity."

Machover argued the computer is an artistic tool just as acrylics and brushes are. "The computer . . . expands what an artist can do," the consultant explained. "The piano is a different instrument from the harpsichord — Beethoven's music is different because the piano was available."

The are two kinds of contributors to the exhibit — those whose training and background is in art and who

(Continued on Page 13)

Student Ethics Hitting New Lows

(Continued from page 11)

vey, Carroll attempted to correlate ethics with other "measurable attributes" of programmers, such as knowledge, problem-solving ability, verbal skills and math skills. He also tried to correlate questions of ethics with the students' general attitudes toward management and organization, whether they tended to be authoritarian or liberal.

Although Carroll admitted he would "hesitate" to predict unethical behavior based on his findings, he noted the most frequent correlation he found was between "confessions of guilt" and a high score on the Certificate of Data Processing (CDP) examination.

High Scorers, Too

And when it comes to breaching security, the high-scoring students are joined by those with practical work experience as those most likely to transgress, Carroll also found.

Students who had held DP jobs or who had worked part-time in the school's computer room were more likely to have breached security, he said, conceding, "That could be simply that they've had more exposure to temptation and to the opportunity to do these things."

One of the main problems, as Carroll sees it, is reaching the diverse types of people who eventually end up making DP-related decisions, people whose training may have been in areas far removed from DP.

Carroll has observed that there are four categories of DPers:

- "General" people — anyone whose work impacts at all upon computers and systems.
- "Hard-core" DPers, who work directly with computers.
- People who are primarily accountants or business-oriented people.
- Computer scientists and hardware and software designers.

"The needs are a little different in all of those areas. The real problem is reaching all these people with ideas about ethics," Carroll concluded.

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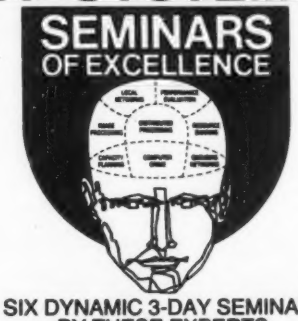
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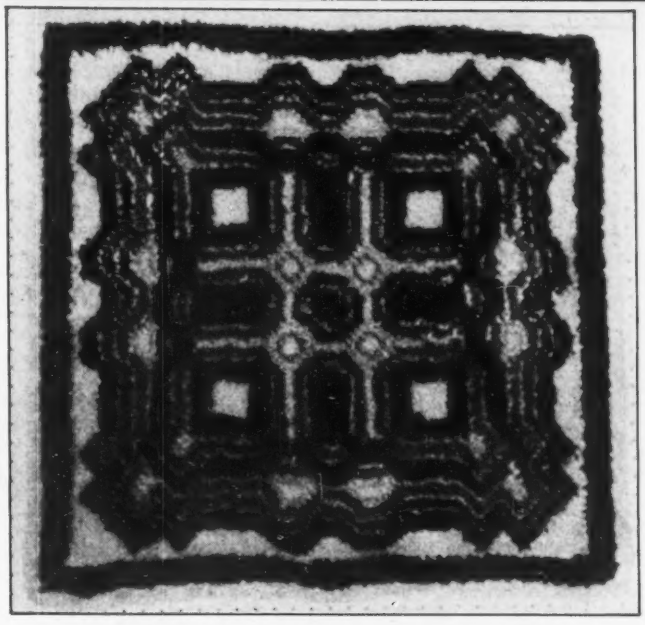
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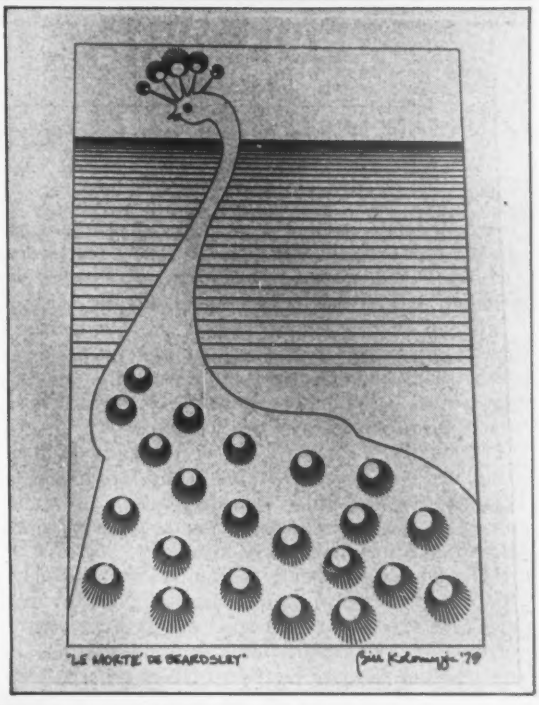
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Above, computer-generated geometric design, executed in hooked rug of Kelly green and orange, by William Apgar and computer-composed line drawing generated by William J. Kolomyjec. Right, "Legendary 3-D Film by Marcel DuChamp," a one-of-a-kind computer plot by Leonard Meyers, is viewed by gallery owner Kathy Westlake through stereoscope.

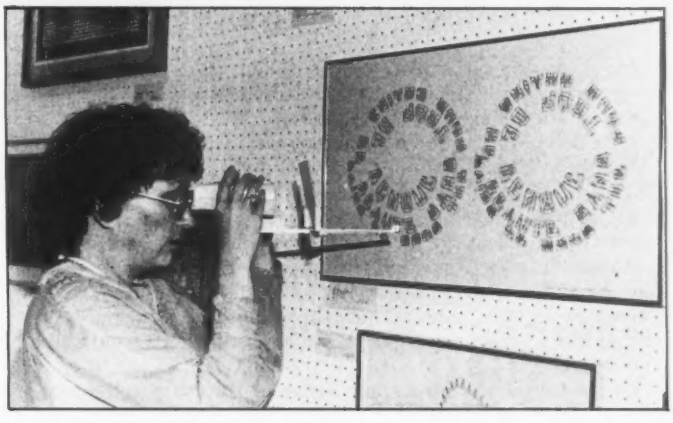


Exhibit Features DP Art

(Continued from Page 12)

get access to a computer and those whose training is in engineering and computers, but who turn to art.

When critics say there is no good computer art, Machover counters that good artists haven't used the computer technology yet. Machover pointed to the Westlake exhibit, which includes:

- "2 x 2," a giant four-panel acrylic by Ruth Leavitt, who takes her basic design from the computer and then makes it into art. Leavitt was an established artist who later became interested in the computer [CW, May 2, 1977].
- "Banana-Cone," a computer line drawing that underscores the sense of humor of its creator, William J. Kolomyjec, an engineering and computer graphics teacher at Michigan State University [CW, June 5, 1978].
- "Ozark Sunset" and other bright, luminous silk-screened limited edition prints by Richard Helmick, an associate professor of housing and interior design at the University of Missouri, Columbia [CW, June 13, 1977].
- "WESTLK3," a computer formica sculpture by Robert Mallary, a professor of art at the University of Massachusetts at Amherst who teaches sculpture design and computer graphics. Mallary made a special visit to the Westlake Gallery to ensure his sculpture would fit the main-floor room. Then a computer developed the various configurations for the three-dimensional shapes, and Mallary picked the one that dominates the exhibit.

Other artists in the "Computer: Artist, Artist: Computer" show are William Apgar, Charles Bangert, Colette Bangert, William A. Etter, Herbert W. Franke, Tony Longson, Leonard Meyers, Joseph Scala and Patsy Scala. Included in the exhibit are several examples of sculpture by solid photography in which a computer and photography are used to create a three-dimensional portrait sculpture.

Weekly Programs

As with other shows at the Westlake Gallery, community interest in the computer exhibit has been heightened by the series of weekly programs on computer-related topics. Since the exhibit opened June 28, there have been discussions on the relationship of computers and art and a presentation of new music consisting of electronic and computer-generated sounds.

The session Aug. 16 at 8 p.m. featured computer music composed and generated by Lejaren Hiller, Flee Professor of Composition at the State University of New York (SUNY) at Buffalo.

"Art, Music and Technology" will be the topic Aug. 23 at 8 p.m. The show will include selections of recent live, electronic, computer and instrumental music from the Sonavera Studio for Sonic Arts, a nonprofit studio for instruction in electronic and computer music located in Hawthorne, N.Y.

Westlake Gallery is in downtown White Plains at 210 E. Post Road, and the computer art show is open 9 a.m. to 5:30 p.m. Monday through Saturday through August 30.

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EDITORIAL

Limiting System Exports

A major confrontation over U.S. export trade policy is likely in the House next month. A bill sponsored by Rep. Richard Ichord (R-Mo.) is scheduled to come up for consideration.

Ichord will reportedly try to persuade his colleagues that the Office of Export Administration, the Commerce Department agency that issues export licenses, is doing a poor job, and as a result, U.S. manufacturers — including those who produce computers — are exporting technology which is significantly strengthening the Soviet war machine.

Last month, a similar attack on present export controls was launched in the Senate. It was led by Sen. Henry Jackson (D-Wash.), who referred at some length to an IBM computer and assorted other technology we have sold the Russians for use in their vast Kama River truck plant.

"There are confirmed reports," Jackson said, that the Kama River plant "is turning out diesel engines for military vehicles." He cited statements by Lawrence Brady, deputy director of the Office of Export Administration, that the U.S. government issued licenses for Kama River exports " 'on the basis that general-purpose trucks would be produced. . . . We would not have wanted to build a plant for military products.' "

However, the Defense Department, the agency which presumably is most sensitive and knowledgeable about military threats, doesn't agree with the senator.

Included in the Senate floor debate were letters from various Defense officials pointing out that the export licenses for Kama River, issued during the Nixon Administration, "contain no restrictions . . . limiting the use of the trucks and engines produced in the factory." Furthermore, the question of whether the plant is turning out military engines "has not been verified." DOD also believes that safeguards of the type favored by Jackson, under which the end use of a computer or other high-technology product would be restricted, could not be enforced.

At the end of the debate, the Senate approved a number of amendments to a pending revision of the Export Administration Act which, in their original form, would have downgraded the Commerce Department's power to decide what we sell to the Soviets. Largely because of DOD opposition, these amendments were softened to the point where, according to some observers, they leave the status quo unchanged. (DOD presently "advises" the Department of Commerce regarding exports of critical technology to the Soviet Bloc, but its advice has never been turned down).

That would seem to be the final word on the subject. However, the AFL-CIO Executive Council came out recently with a statement that "the massive buildup of Soviet military might . . . has been aided by profit-hungry U.S. corporations selling America's most critical technology" (See story on Page 4).

It seems likely, as a result, that the whole issue will be resurrected next month in the House. Hopefully, the congressmen will read the proceedings of the Senate debate before they vote.



DATA PAST

Five Years Ago
Aug. 21, 1974

STOCKHOLM — Future hardware systems would use display terminals to perform on-site maintenance functions, with data called up on-line from a central data base dedicated to fixing system malfunctions, M. J. Marcus from IBM in Poughkeepsie, N.Y., predicted at a meeting of the International Federation for Information Processing.

Eight Years Ago
Aug. 25, 1971

WASHINGTON, D.C. — The inability of electric utilities to provide consistent, reliable power has "for too long been put aside," according to Sen. Lee Metcalf (D-Mont.), who called for a national system for exchanging electricity. While such a system is only one solution, Metcalf admitted it would be at least three to five years away.

LETTERS

Answer to Problems?

In " Has Age of Systems Incompetence Begun?" [CW, July 30], the implication was that "the sky is falling" and that the answer to all these "problems" is of course, "systems inspection."

But let's look more closely at some of the systems incompetence horror stories cited:

1. The Teton dam was only one of many others which have operated safely for decades. Does anyone remember the Tacoma Narrows Bridge of 1940.

2. The swine flu program was a political decision.

3. Auto defects are an American labor problem; imported cars have far fewer defects.

4. No one was injured at the Three Mile Island nuclear facility.

5. Isn't it amazing how few jumbo jet crashes have occurred in spite of a record number of air travelers?

6. Is someone surprised that the high-technology, crash-project Alaska Pipeline developed a leak?

7. No one was injured by Skylab. But approximately 135 died in U.S. auto accidents alone on July 11.

Will inspection make the world perfect or accident free?

Although Jack Stone did not say it, there are many who would use his "logic" to "prove" that we need more organizations and agencies (who live at someone else's expense) to inspect, regulate and control those few in this country who still produce.

Robert M. Kelley

Kettering, Ohio

Taking Exception

The July 23 article "Help Available For 'Burned' Users" was great reading. Our compliments to the author. Although the article makes many good points, it contains a few points to which I take exception.

The article mentioned a new breed of consultant. We question whether there is a "new" breed of consultant. Some firms like mine, have been successful independent minicomputer system consultants for many years.

There is considerable mention of placing a larger share of the blame for the failure on the user. I will not say that the user should be held blameless for getting burned. Yet, I cannot agree that the user should share a larger part of the blame.

In most instances we have seen, the vendors have not performed any site surveys or design requirements analysis prior to suggesting system solutions. These two inactions increase the users' expectations. They get the impression that since they don't have to tell the computer anything about their business, it must know everything, and therefore should be able to do anything they ask of it.

Richard W. DiJulio

Northfield, Ill.

Far From 'In Depth'

In my naive way, I have assumed that the "In Depth" section of *Computerworld* was reserved for a thoughtful kind of commentary not available in other parts of your publication. I was rather unpleasantly surprised by "A Cookbook Approach to Structured Methodology" [July 16].

The first few paragraphs of the article were funny enough. They highlighted the problem of terminology associated with teaching or learning structured techniques. They could have been a decent lead-in for a thoughtful article.

After reading past the lead-in, I started wondering what the article was about. It seemed to me that the author had set the stage for making a point of some kind about structured techniques.

Instead, the article degenerated into a very shallow commentary. It was far from an "in depth" presentation.

Michael Silves

Seattle, Wash.

READER COMMENTARY/ Joe Rigo

Who's Doing All That Personal Computing?

The search for light-hearted summer amusement recently took me to the bankruptcy hearing for a local computer store. The hearing was short, and the story was familiar.

The owner started out selling hardware kits to hobbyists. It wasn't working, so he switched to stressing complete systems for businessmen.

There was a lot of interest. He heard a great deal about the boom in personal computing. He spoke to every business group in town. But somehow, the sales weren't there.

The micro field is like that. There is a lot of action, but not much profit. Even Radio Shack, the industry leader, makes you walk past its CB radios and TV sets before you get to the computer department.

Microcomputers have a solid place in process control. They help run oil rigs in the North Atlantic and electronic games at the corner bar. But where is all that personal computing that we hear about?

Right now, it seems there are four types of customers for micro systems.

Customer Number 1 is the electronics hobbyist who started it all. He doesn't really care what he is buying. He just wants to glue the pieces together and talk about it with other hobbyists.

The hobbyist used to hang around the computer stores, but they don't want him anymore. They have gone respectable. They are pitching business systems for small companies. Many owners are more polite to their neighborhood burglar than to a hobbyist who walks in to buy a hardware kit.

Customer Number 2 is Dr. John Jones. Dr. Jones already has three cars, a color projection TV set and a summer home in Maine. This year he wants a computer.

Dr. Jones buys a fully assembled tape system with an accounts receivable package and two dozen game cassettes. The cost is $3,000 plus tax.

"It's for my waiting room patients," he tells the salesman. This makes it a business expense. As John K. Jones, M.D., P.C., he will pay $1,000 for his investment in business equipment, and the Internal Revenue Service will pay $2,000, plus half the tax.

Customer Number 3 owns the local clock factory. He has been using a service bureau for his payroll and other data processing. Now he and his tax advisor have noticed that small computers are cheap.

So the factory owner lays out $5,000 for a disk system with a good printer plus $29.95 for a general ledger program package. He takes his system to the office and quickly learns two things: His packaged program provides for a single six-digit account number, but his business requires two four-digit fields and it will cost him $250 for a programmer to modify the account number fields in his $29.95 program. And that's only the first item in the cost of running his own data center.

The factory owner immediately renews his contract with the service bureau and gives the computer to his son in high school.

At this point, there is a little personal computing going on, but very little.

The electronics hobbyist is automating freight yard switching for his model railroad club. Dr. Jones is playing electronic ping pong with his accountant. And the factory owner and his son are learning togetherness in joint sessions with the Osborne Gen-

(Continued on Page 16)

HUMAN CONNECTION/Jack Stone

DPer's Mental Jousting Keeps Salesman on Toes

"I'll tell you why this business is great. Although I could easily be trampled by my customers — DPers in large IBM OS installations — they now treat me as an equal who can solve some of their key problems. But frankly, they make me earn my selling wings every day."

This statement was made by Chuck Taylor, a young software salesman, perhaps the first one willing to give his candid views on DPers for the trade press.

"Sometimes I wonder what it is that drives these people. As a group, they are very professional. They care about what they do and want to do everything right. They are unusually strong in their technical knowledge of a field that is highly demanding and requires intense dedication.

"Yet with all their creative abilities, I find it remarkable that so many DPers seem to have so many common personality characteristics. For example, most DP managers I know are one of two personality types — the 'technocrat' or the 'bureaucrat.'

'Most DP managers I know are one of two personality types — the technocrat or the bureaucrat.'

"The technocrat is younger and works his way up from technical support to manage the entire installation. He is an intellectual and really shows it during my sales calls.

"For example, he constantly 'jousts' with me, using mental gambits to trap me in my mistakes. When I become overly enthusiastic about my products and make exaggerations, he catches them quickly. He then makes it very, very clear that I am in error.

"Once I have acknowledged his superior technical knowledge, he continues to work with me because he knows that I'm trying to do an honest job and I'm really not trying to oversell. I must admit, though, that I did an awful lot of acknowledging when I first began to call on OS accounts.

"The technocrat is consumed with technical matters. The capabilities of my product and how it can solve his problem are all he cares about. He makes his own decision and on his own good time. And he digs deeply into the literature and contacts a long list of reference installations to verify his findings before he buys a product.

"The bureaucrat is also competent in his job, but his interests and style are much broader. He 'governs' the shop, while the technocrat 'controls' it. The bureaucrat gains confidence in me, not by 'jousting' but by my image of confidence and sincerity. The bureaucrat is more accepting of what I say, because he really only cares that my product will help him run his shop better and give him value for his dollar; he really isn't interested in how the product works.

"The bureaucrat makes the decision to buy my product based on other than purely technical considerations. He sometimes buys impulsively and is not as concerned with what others have experienced with the product. Many bureaucrats make the decision based on which product is best for the business and not which has the most advanced features.

"The only nonmanagers I normally see are systems programmers. They completely divorce themselves from business considerations when they are evaluating my product. They judge its merits almost entirely on whether the product is state-of-the-art, irrespective of whether the installation has a real need for its features.

"And there's no question in my mind that they can make the technical judgment — they eat technical journals for breakfast.

"In certain respects, though, I feel that these people can be very opinionated. Many seem to have a knee-jerk negative response to new ideas, particularly those that were not invented by them.

"However, should they take a liking to my product, they will try to move heaven and earth — short of losing their job — to get the product for their installation. In the trade, we call these people 'white horse chargers.'

"Since my customers force me to stay on my toes, I try to perform in the very best way I can. They've taught me a lot and I'm really pleased to be a part of the business."

THE TAYLOR REPORT/Alan Taylor

Two Problems Crop Up In Bankcard Procedures

Credit card problems are always being sent to me, but it is quite unusual for two separate problems to arrive from the same Bankcard center at the same time. This happened when readers Henry Valo of Minneapolis and Thomas Gerber of Aberdeen, S.D., both sent in copies of their July dealings with the First National Bank of Omaha Bankcard Center.

This center deals with both Visa and Mastercharge accounting as part of the credit card network, and both readers had found holes in the First's systems.

The Valo hole is easier to understand and, perhaps, is more certainly a hole. The figure shows the story: The bank is charging interest on a credit balance, thus making money on money it owes!

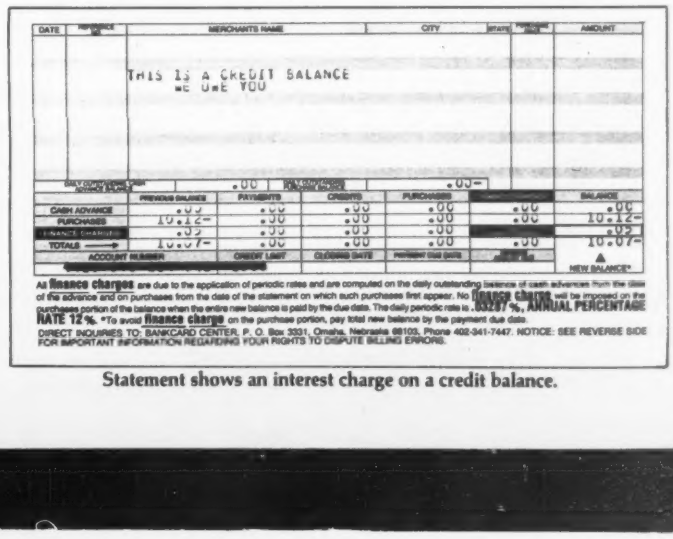
Technically, the problem belongs in the test for the minimum amount of interest to be charged. There is a missing, or inaccurate test in the program which substitutes a minimum amount (5 cents) for a smaller computed amount.

In the Omaha system, perhaps by the confusion of a created minus zero figure (See Valo's Daily Outstanding Purchase Balance), the test clearly is only working on the absolute figure and so is going wrong when it deducts the five-cent figure.

False Charge Problem

A more widespread problem which the Bankcard Center is failing to face deals with the problem of known false charges being accepted by the system with no action being considered to stop them. This problem was brought to the attention of one of the vice-presidents, James L. Doody, by Tom

(Continued on Page 16)


DATE | REFERENCE NO. | MERCHANTS NAME | CITY | STATE | PURCHASE DATE | AMOUNT

THIS IS A CREDIT BALANCE
WE OWE YOU

DAILY PERIODIC RATE APPLIED TO AVERAGE DAILY BALANCE .00 | NEW BALANCE ENCLOSED .00-

	PREVIOUS BALANCE	PAYMENTS	CREDITS	PURCHASES		BALANCE
CASH ADVANCE	.00	.00	.00	.00	.00	.00
PURCHASES	10.12-	.00	.00	.00	.00	10.12-
FINANCE CHARGE	.00	.00	.00	.00		.05
TOTALS ——→	10.07-	.00	.00	.00	.00	10.07-
ACCOUNT NUMBER		CREDIT LIMIT	CLOSING DATE	PAYMENT DUE DATE	AMT. DUE	▲ NEW BALANCE*

As **finance charges** are due to the application of periodic rates and are computed on the daily outstanding balance of cash advances from the date of the advance and on purchases from the date of the statement on which such purchases first appear. No **finance charge** will be imposed on the purchases portion of the balance when the entire new balance is paid by the due date. The daily periodic rate is .03287 %, ANNUAL PERCENTAGE RATE 12 %. *To avoid **finance charge** on the purchase portion, pay total new balance by the payment due date.

DIRECT INQUIRIES TO: BANKCARD CENTER, P. O. Box 3331, Omaha, Nebraska 68103. Phone 402-341-7447. NOTICE: SEE REVERSE SIDE FOR IMPORTANT INFORMATION REGARDING YOUR RIGHTS TO DISPUTE BILLING ERRORS.

Statement shows an interest charge on a credit balance.

Problems Evident With Bankcard Center's DP

(Continued from Page 15)
Gerber, and then it was passed down and evaded by Mary Brown, the operations officer.

The Gerber situation arose when a bank investigation last April showed that a charge sent in by the Fourth National Bank and Trust of Wichita, Kan., was improper. In fact, not merely did Gerber deny the charge, but investigation showed that the name and number had been written in — apparently by a firm called Gibson's Products of Mobridge, S.D., and the signature was apparently that of a "Jyaffe." But despite this having been found not to belong to Gerber's account, it was again transmitted, accepted and posted to the Gerber account in May. Gerber, in early July, protested to Doody, claiming that known erroneous input should be kept out of the system. Brown, in response, claimed that the bank could not "guarantee that this will never appear on your account again," thus raising the precise question that Gerber had asked the bank as to whether the account holders were protected against known false input.

Technically Possible

It is certainly technically possible to protect account holders against such known false input, even though the charge is trasmitted electronically so that the facts that were obvious to the Kansas people (handwritten name and number) were not available to Omaha. One obvious way would be to include a "hot list" of known attempts to post false charges to an account. This list could be made either on the account or in a central area referenced by a flag and date reference. This could hold out such duplicated items from final posting until they are visually checked for conformance with policy.

The Gerber probelm is serious indeed, but the Omaha problem is perhaps of more importance. Both the Valo and Gerber problems demonstrate a lack of proper management of the Omaha system. Clearly, the finance charge routine was not tested, and I don't think the testing procedures in the organization are adequate to pass a full DP audit. So that is problem number one.

And, equally clearly, management is either not sensitive to the problems of its cardholders or else is simply trying to evade answering awkward questions.

Gerber should have gotten a clear answer to his question: "Does Visa have an obligation to users of Visa cards to stop putting through bills that have already been rejected?"

Which leads to the general question: Just what is going on at the Omaha Bankcard Center?

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What About Personal DP?

(Continued from Page 15)
eral Ledger manual.

Meanwhile, Customer Number 4 is buying his first system. Number 4 is a former programmer. Right now, he is getting a system to play with at home. But in a few weeks, he will lug the whole thing into his office.

It will come in handy. Some people in his departemnt will program it to handle small but repetitive calculations that they have to do every week. Another guy will use it to maintain a list of names that is currently on a deck of index cards.

It will work because Number 4 is a Super Techie at heart — an electronics hobbyist who can't stand the smell of glue. He will work hours on his own time to keep the hardware running, patch the system software and back up the disk files every night.

Other departments also want their own computer, but they don't have any former programmers to handle its care and feeding. So they will wait patiently until IBM gets around to showing everyone else how to sell small systems to big companies.

Meanwhile, thousands of programmers are building a new cottage industry. They work for big companies during the day. Nights and weekends, they are writing applications programs for micros.

For the most part, they are developing word processing systems and payroll-type programs for small businesses. Every one of them is convinced that he will succeed by working harder, turning out a better product and selling it at a lower price than his competitors.

I don't think I want to be one of them.

I also don't want to open a computer store.

But it might be a good time to invest in some business equipment. Just so I'll be ready when personal computing finally sweeps through the big corporations, where it belongs.

Rigo is president of Sysdoc, Inc. in New York.

LETTERS

Duplicate Mailings

It was rather shocking to read the July 9 editorial regarding the sending of duplicate promotional pieces to an individual, and in some instances, sending five or six of the same promotion. The editorial maintained that nothing could be done about this.

For the last 10 years or more, a program called Duplicate Elimination has been used by many of the mailers in this country for the purpose of suppressing more than one mailing piece going to an individual or household.

Instead of receiving labels, magnetic tapes are sent for the purchased lists. Through a matchcode program, these purchased lists are matched against each other. Where there is a match of one or more names, one lable is output.

Jack Pitchon
Pelham Manor, N.Y.

Cramped Quarters

Regarding your ad in the July 23 issue: Sure a Rolls-Royce would cost only $2.50, but how could you get six passengers into an automobile that fits on your fingertip?

James Harper
Melbourne, Fla.

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LETTERS

Obvious Solution?

In "Lack of 'Disaster' Plan Means Headache for User" [CW, July 23]. Bernard Donnelly mentioned that he was "trying to figure out where the propellers for this big bird were."

He should have brought in several big propellers. What was used for cooling before air-conditioning systems? That's right, fans — with big propellers.

Neil Allison

Toronto, Canada

Answering Criticisms

Dr. Heinz Wolff's comments, reported in "A Note of Caution' [CW, Aug. 6], presented in compact form a number of common criticisms of technology, and consequently provide a convenient opportunity for answering these criticisms, which are not always stated so clearly.

Wolff said that technology is anti-egalitarian because special training and knowledge are needed to use it. This is true; any physically fit person can push a plow without much practice, but only people who have gained a certain amount of knowledge can invent and program technological devices. In an advanced society, the total amount of knowledge available is many times what any person can learn; consequently, each person must concentrate on some particular area of expertise.

This is the principle of division of labor, and it is one of the major factors contributing to a prosperous society. It is true that as specialization increases, society as a whole becomes "less able to make rational decisions" about specialized fields; but there is no reason why such collective control is especially desirable.

Wolff fears that technology will wipe out "necessary skills" and "intellectual life." This is an old claim, dating at least from the invention of the automatic loom. But every practical technological discovery permits people to do things with less effort and time, freeing them to develop higher skills and to improve their intellectual capacities. Without the computer, for example, people would have to spend more time on routine bookkeeping rather than being able to shift their attention to more complex problems.

Closely related is Wolff's "fear of losing jobs to computers." History has proven repeatedly that automation does not cause unemployment. On the contrary, it improves a worker's productivity and increases his real earning power.

Finally, Wolff stated that "there is no real evidence that the public wants these alleged benefits" of technology. But the most reliable test of what people want — their purchasing choices — proves him wrong. If people did not want the benefits of, for example, computerized banking or insurance sytems, firms that did everything with paper and ink would still be prospering.

Asking people questions like "What do you think of computers?" proves little, since most people do not have the knowledge necessary to evaluate various technologes. What people *are* capable of judging is the end product they will use. It is their response to this product that reflects their informed estimate of the technology that made it.

Gary D. McGath

Milford, N.H.

Definition for 'Recuse'

In the front-page article "IBM Wants New Judge in New York Antitrust Trial" [CW, July 23], I found the editorial comment [sic] in paragraph three most offensive.

Any good legal dictionary would define the term "recuse" for you. It means "to challenge (a judge, juror, or court) as prejudiced or otherwise incompetent to act."

Bobbie I.ee Eubank

Gainesville, Fla.

Communications Snags

Thanks to Roger Firestone's "Advice to NCC Critics: Take Part in Planning" [CW, Aug.6], it is now very clear to me that my "basic misunderstanding of how an NCC is put together" was due to two things: a lack of clairvoyant omniscience and too small a pile of *Computerworld* back issues.

In trying for a philisophical view of this impromptu repartee, I see — in microcosm — the ingredients of the underlying problems that persist in plaguing our profession. These boil down to people failing to listen, understand and respond to people.

Peter Kushkowski

Hartford, Conn.

So There!

It has been amusing to note Eastern reaction to gas lines recently after all the months of our getting yelled at from 3,000 miles away. That I have come to expect from the White House, ABC, CBS, NBC and even PBS, not to mention the Eastern-based print establishment. But from *Computerworld*?

As regards "Computers Merge commuters, Cars" [CW, July 23], I say: Bully for James Wilde, Russ Mawn and Gerard Kennedy and BOO! for the Commonwealth of Massachusets, the State of Maryland and CW's reporters. Wilde, Mann and Kennedy certainly did not invent or popularize computerized carpools.

I don't know who invented them (or where), but I am bound to advise you that the State of California has funded similar operations *with public funds* for at least two years in the San Francisco, San Jose, Sacramento, Los Angeles, Santa Ana and San Diego metropolitan areas, with extremely good results. So there! (We have state-funded vanpools, too.)

Hugh M. Hamilton

Palo Alto, Calif.

On Vocational Schools

The Taylor Report "Do Vocational DP Schools Produce Programmers?" [CW, July 23] requires a response.

I am a recent graduate of the Chubb Institute in Short Hills, N.J. I suggest Alan Taylor's findings are misleading and discouraging to employers wishing to hire vocational school graduates, persons wishing to attend a vocational DP school and graduates.

Taylor stated that he found the courses in DP schools did teach programming languages, but their graduates generally did not use the languages after graduating and instead went into other computer-related fields. Taylor admitted that he investigated only a "few" schools. Checking into a few schools is just not a valid sample. If he took a larger sample, he would find those "good" professional schools such as Chubb Institute and Insco of Neptune, N.J. who turn out good programmers.

If one were to look at the placement record of one of the many good DP vocational schools, we would find that the majority of the graduates do indeed become programmers and do not "do just about any task that is around the computer." We must not forget that programmers are in demand.

The article also stated that "teaching the languages is called teaching 'programming' but it just isn't. The students don't particularly either care or understand."

I suggest Taylor clarify himself further on this statement. Students who don't care or understand hardly last for two simple reasons: Those who don't care would not pay the high tuition cost, and those who don't understand never get the programs running and find themselves dropping out or on probation.

The person wishing to enroll in a DP school should be aware of fly-by-night DP schools. However, the article did not present a true representative picture of the "vocational DP school."

Norman Rankis

Roselle, N.J.

Proper Title

Steven D. Riedel was recently appointed vice-president of product marketing at Northern Telecom Systems Corp., not vice-president of marketing as announced in the July 2 issue of *Computerworld*.

P.A. Kraska

Northern Telecom Systems

Minneapolis, Minn.

Computerworld **welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.**

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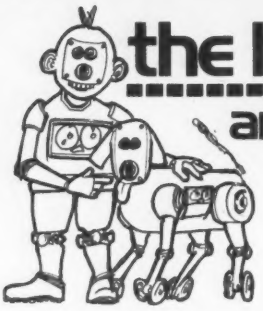
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the hexadecimal kid and his faithful dog ascii

A FANTASY IN SIXTEEN BITS

by Richard Forsyth

BIT 16
(THE PARITY BIT)

After a traumatic night, Hex has left Base 16 to seek Ascii, whose distress call he has picked up by radio. He makes his way to Silicon Valley once more, where he is confronted by a scene of devastation. All the humans in the reservation have been killed by the neutron grenades of the Night Operators — all, that is, except Dr. Null, who lies mortally wounded under a binary tree attended by the faithful Ascii.

Dr. Null discloses to Hex two startling secrets: first, that he is not Samuel Synapse — as stated in the Data Base files — but Abraham Synapse, his father, founder of neurocybernetics; and second, that Hex himself is none other than Samuel Synapse.

Dr. Null appeared exhausted by the effort of speaking. Already his face had taken on a yellowish tinge. Then, summoning his last reserves, he began again. "Your task is to struggle to keep alive an alternative technology. You must attempt to recruit androids to the cause. After all, androids are the old guard now; there is bound to be some disaffection as they are phased out in favor of robots.

"Above all, you must act as caretaker of the natural balance, preserving biological culture from the depredations of the System. The worst possible future would be one in which there was nothing but the system."

"You mean that when it finally went gigotic and snuffed itself out there would be nothing left at all?" Hex asked.

"Exactly. All human and animal life will have been in vain."

"I see."

"Here," Dr. Null said, removing his jacket. "Take this. You may need it."

On his shoulder, Hex could see a small blackchip like an insect squatting on its 40 pins, which Null removed. "This is the prototype Multimodular 69, the computer they never dared build. It has fully parallel recursive stack architecture with Algol 69 (the French version of Algol 68) as machine code. In addition, it has 256M bytes of content addressable main store, each location with its own pipelined processor. The backing store contains all my knowledge of the Data Base's internal workings."

Hex's jaw dropped at this new revelation. "Then you are an android after all!"

"Yes, but unlike you, I have cerebral override. My brain is in control. It can always interrupt the computer."

"I am relying on you, Kid," he said. "Just remember: the hardware they come, the software they fall."

Those were Dr. Null's last words.

For some minutes, Hex remained, gazing at the body as if he expected Dr. Null to wake up and continue his speech. Then he went over to Ascii, who had maintained a respectful distance. Sensing Hex's mood, Ascii stayed quiet and allowed Hex to examine all his circuits. Null had left him in good working order.

"Okay boy," Hex said at length. "Let's get digging."

When the hole was ready, they lifted Null over, laid him down in the earth and piled the loose soil on top of him. Then Hex stood for a while in silence.

The gathering gloom persuaded him to look for shelter. They moved a short distance into the wood and made camp. Hex collected some unconditional branches, which Ascii ignited with his laser eyes, and they sat round the flames to warm themselves as night fell.

The full realization of what had happened and what he had done was only now beginning to sink in. Hex had certainly become an outcast from the System: There was no chance of his being accepted back after such grossly unsystematic conduct. Yet somehow, though he had been impressed by Dr. Null's words at the time, he still had doubts.

Was Dr. Null really Prof. Abraham Synapse? Could he, Hex, be Samuel Synapse, the professor's son? Was Dr. Null's prediction of the fate of the System necessarily right?

These and a hundred other uncertainties drifted through his consciousness. It was not easy to abandon the beliefs of half a lifetime overnight and to see the System, his lifeline and mentor, as the enemy — as the most dangerous destructive force on the planet.

What could he do about it anyway? He was just a lone android, cut off from all normal communion with his fellows, severed from the reserve of information he had come to rely on.

Hex felt overwhelmingly alone. He was going to miss the give and take of the Network. He was going to miss Simula too, very much.

Eventually he fell asleep. When Ascii nudged him awake, the sun was already high in the cloudless sky.

Where could they go?

Ascii looked up expectantly for some kind of lead. Hex stood there, meditating. On the spur of the moment, Hex made his decision and set off purposefully into the bright new day. Ascii bounded along behind him.

"Well," he thought as they left the wrecked human city and he could once again take a deep breath of clear air, "at least I'm free."

They marched southwest through the deserted valley. Hex had no plan, only a sense of the right direction, and he knew, without consciously having to frame the thought, where they were heading. Every step took the pair closer towards Sprocket's Hole, and Cleo.

Is this the end, or just a new beginning?

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Forsyth is software manager for RAIR Timesharing in the UK.

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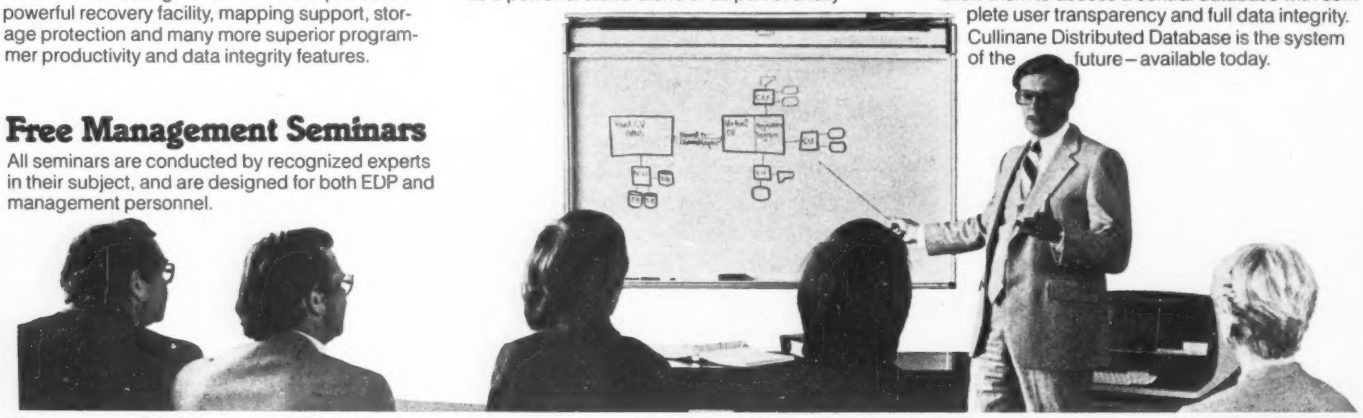
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Guide Leads Way to Good RCS Usage

By Don Leavitt
CW Staff

FORT LEE, N.J. — Over time, various publications have focused on different aspects of the methods needed to find and use the best available remote computing service (RCS) vendor. Few of those efforts — except for the work done by the Association of Time-Sharing Users — are as ambitious as the one recently mounted by Evans Research Corp.

The Evans effort has resulted in an impressively thick loose-leaf *Guide to Planning, Selecting and Managing Remote Computing Services*, which the company describes as a subscription service with quarterly updates offering RCS users and suppliers an authoritative aid in decision making.

The Evans book devotes some time to describing the RCS industry in general and the possible role RCS has in a using organization. The book reviews the idea, for example, that RCS can either supplement or complement DP facilities the user already has in-house.

The trade-offs to be considered in the RCS vs. small business system for the small user just getting into DP are also spelled out in some detail.

Balancing the background material, the *Guide* also forecasts how the RCS subindustry will develop between now and 1985. An appendix, making up nearly half the book, contains specific data about 20 of the major RCS vendors and is formatted so that comparison is simplified.

The bulk of the remaining portion of the book, however, appears to be its heart. Here, Evans spells out, step-by-step, the methodology that should be followed by organizations considering or using RCS facilities.

The eight steps suggested sound like common sense itself, but Evans also provides ample, though sometimes strangely organized, discussions of each step. The text explains what is really intended by the brief words used to name the step and the implications — to the organization and to the specific project — of taking the step.

To "develop a statement of RCS policy" is the first step, and the guide notes that such a statement should specify every level of management responsibility pertaining to the RCS evaluation and selection process. It need not be lengthy, but it must be written, Evans emphasized.

The second step proposed by the guide may well be the most controversial one in the whole book. It calls for the selection of an RCS administrator to monitor all RCS-related activities in the organization.

One of the reasons RCS use has grown within organizations in the past has been that the user department/RCS vendor tie has

(Continued on Page 22)

Improved Tape Library Manager Backs Large Honeywell Centers

HOUSTON — Release 2 of the TOSC4 on-line, real-time tape library management system from TOSC International, Inc. extends the security support available to Honeywell, Inc. large-scale users under the software.

Despite the updating, however, the most important feature of TOSC4 is probably its basic ability to protect data from inadvertent loss caused by writing over a good tape. The system checks the status of a tape whenever it is opened as output, and if it is not in scratch status, processing is stopped and a message is sent to the operator, a spokesman said.

The security features implemented in Release 2 prevent unauthorized access to data on an input tape. TOSC4 allows the installation manager to specify which user IDs have permission to read or write certain tapes. At open time, a security master file is checked to determine if an executing job has permission to work with the requested file.

If permission has not been granted, the job is aborted and message is posted to the user's execution report an to the operations supervisor's log report, the spokesman noted.

Releasing to Scratch Pool

The system includes a batch job that releases tapes to the scratch pool once their retention dates have expired. The job also notifies the user when it is time to move tapes to other locations and tells the user where to put them.

In addition to a series of printed reports showing tape status, the system also supports terminal inquiry and updating of the master files. The updating facility is available only to the tape librarian, the spokesman was quick to add.

TOSC4 includes support for the optional production of gummed labels for marking tape reels, but many installations run their operations without labels.

TOSC4 operates on Honeywell 600, 6000, Series 60 Level 66 and DPS equipment on all releases of Gcos. The on-line portion of the system requires 7K words of memory; the terminal inquiry/-update, 8K words; and the largest batch program, 8K words.

The package can be acquired under license for $16,500. Maintenance, after the first year, costs $1,320 annually, the vendor said from Suite 1105, 5433 Westheimer, Houston, Texas 77056.

'MDS' Eases Cobol Documentation

MOBILE, Ala. — The Matrix Documentation System (MDS) from Winston T. McCleery, Consultants, is a Cobol-based documentation generator that can be used during the user's development effort or when maintenance of a previously undocumented system is under way.

Originally offered as a single package, MDS has now been modularized so that users can pick and choose the facilities they need. In addition, Release 9 of the system, now available, enables the user to have the generated documentation printed on one or both sides of an 8-1/2-by-11-in. page, a spokesman noted.

The Reverse Documentation Generator module (MDS-1) is the part of the system intended for programs in maintenance mode. The module accepts Cobol source code as input and generates file record layouts and system flowcharts graphically. It also generates file and data element usage matrices as well as data element descriptions, he said.

Additional Abilities

The Basic Documentation module, MDS-II, includes all the features of MDS-I plus the ability to produce the three primary Cobol program divisions. Users can also input new application systems information manually.

The Five Documentation Manuals module, MDS-III, was designed for installations requiring formal documentation including extensive narrative descriptions. It produces manuals covering "Systems Description," "Program Definitions," "Data Element Dictionary," "DP Operations" and a user's guide.

MDS-IV is a complete package, incorporating the capabilities of both MDS-II and MDS-III.

MDS-I costs $4,800, while MDS-II carries a one-time fee of $9,800. The Manual module (MDS-III) costs $18,000, or $750/mo for 12 months, and MDS-IV is valued at $24,800, or $825/mo.

Optional enhancement fees are available for those users who wish updates, McCleery noted from 705 Commerce Bldg., P.O. Box 337, Mobile, Ala. 36601.

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Package Puts WP in Cobol Shops

MINNEAPOLIS — The Multiword word processing (WP) software from Delphi Data Systems, Inc. is written in Cobol and provides users with a wide range of advantages not available in any other single package, according to a spokesman.

There are, for example, versions already available for IBM, Honeywell, Inc., Data General Corp., Hewlett-Packard Co. and Northern Telecom environments, and the software is "easily adaptable" to other settings that support Cobol, he said.

Text can be exchanged between CPUs built by different manufacturers because all input to the system is in card image format. Organizations with several types of systems can build a compatible text processing network with the equipment they have, the spokesman claimed.

Media Flexibility

Media flexibility is said to be another strength of Multiword. Input can come directly from on-line terminals, cards, disk, diskettes, tapes and remote job entry stations.

Input from several sources can be combined to produce a single output document, and it can be routed to line printers, line quality printers, magnetic media and remote systems, the spokesman continued.

Word processing features such as text editing, margin control, page numbering, headers, footers, line spacing, variable text insertion and mass letter writing are included in Multiword. Special commands facilitate exchanging text between computers, he said.

The object-code version of Multiword costs $3,200 per system, the company reported from 7544 Stevens Ave. S., Minneapolis, Minn. 55423.

CORRECTION

Software Dynamics — not Software Dynamics, Inc. — was the vendor involved in "Software System Manages Micro Investment" [CW, July 30]. Software Dynamics is at 2111 W. Cresent Ave., Anaheim, Calif. 92801.

RCS Approach Must Be Tidy

(Continued from Page 21)

been very direct, making it possible to avoid the entanglements with the DP staff or upper corporate management that often spelled delays.

Coordination Encouraged

The result of such independent, solution-oriented acquisitions of RCS support, however, has sometimes been uncontrolled RCS costs.

It is Evans' contention, and the observation of many others, that establishment of a company-wide coordination effort can mean substantial dollar savings, because it could lead to consolidation of work with a limited number of RCS vendors and a greater likelihood of gaining their volume discounts.

Once the RCS administrator is in place, the Evans procedure is to determine user requirements and develop a project definition statement; search out RCS vendors and develop a candidate list; construct a load profile of the proposed system; prepare a formal request for proposal; prepare, run and evaluate a benchmark; and negotiate the RCS contract.

Often Overlooked

Again, many of these steps sound very sensible and very obvious but, as Evans points out, they are often overlooked, praticularly by user departments that find themselves with what appear to be the perfect solutions to their problems, as a result of the timely appearance of an RCS salesman.

On the other hand, the discussions on both the benchmarking of RCS work and the negotiating of a contract are extensive and apparently quite comprehensive. As these are areas that might not be familiar to the organization just getting into RCS work, the coverage is well deserved.

The guide costs $395/year, discounted to $690 for a two-year subscription. Extra copies of the book are $65 apiece on the annual plan and $55 each on a two-year option, Evans said from 1394 Palisade Ave., Fort Lee, N.J. 07024.

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Task Group Gets Organized To Aid Software Standards

ROME, N.Y. — A committee met here recently to begin the work of the Terminology Task Group of the IEEE Computer Society's Subcommittee on Software Engineering Standards.

The startup group was drawn from a "flood of people" who answered a call for volunteers issued this spring [CW, March 26] by Task Group Chairwoman Shirley Gloss-Soler.

At its Aug. 6-7 meeting, the committee selected "a very large group of terms" that needed definitions. It also named leaders for and set up lines of communication between the special interest groups within the task group, she said.

Now quite hopeful the task group will accomplish something useful, Gloss-Soler admitted that the size and positive nature of the response to the call for help was "staggering" at first.

There were more than 130 volunteers and "100 of them really wanted to work," she recalled. That was more than she had expected and more than she felt able to work with directly, so she backed away from doing anything immediately.

Screening the list of volunteers, she found a number who said they could devote a lot of time to the project. From that nucleus, she picked the coordinating committee that met here, including people from each of the possible special interest groups — testing, quality assurance, reliability — cited in the intial call for volunteers.

Further Separation

In fact, the list of special interest groups has grown to 10 as a result of the meeting and that should allow anyone to focus their work as narrowly as they wish, she added.

The list of terms the coordinating committee selected to define first were taken from a glossary Gloss-Soler had been compiling on her own. The target terms were picked, she said, because the committee saw them as the most fundamental subset of the complete glossary and as terms on which agreement seemed possible.

The members of the coordinating group are expected to contact all of the volunteers shortly to confirm their continuing interest in the project and to ascertain, if possible, which area of work really represents their special interest.

Although special interest groups may wish to meet on occasion, Gloss-Soler still expects much of the work to be completed by mail or by telephone. More information about the project is available from the chairwoman at ITT Research Institute, Box 1355, Branch P.O., Rome, N.Y. 13440.

Pascal Runs on DG Units

NEW YORK — The first in a series of five implementations of Pascal has been introduced by Rational Data Systems (RDS) for use on Data General Corp. minicomputers.

Available now, the first version is for DG Eclipse systems running under AOS. Four other implementations, including two multiuser RDOS/DOS versions, will follow shortly for DG's RDOS and DOS environments, a spokesman said.

All versions of RDS Pascal are source-compatible and each can cross-compile for any of the other systems. Thus, a Pascal program can be developed on an Eclipse and executed on a Micronova, or vice versa, the spokesman pointed out.

RDS has extended Pascal to make it more suitable for commercial applications. The extensions include STING and DECIMAL variables, file-handling features for programs that use interactive terminals, random access of files, program segmentation to allow execution of very large programs and a generalized interface to the host operating system.

The AOS version costs $3,500 per system.

The single-user RDOS/DOS versions ($2,500) will be available later this month while the multiuser implementation ($4,000 per system) are scheduled for October release.

RDS is at 245 W. 55th St., New York, N.Y. 10019.

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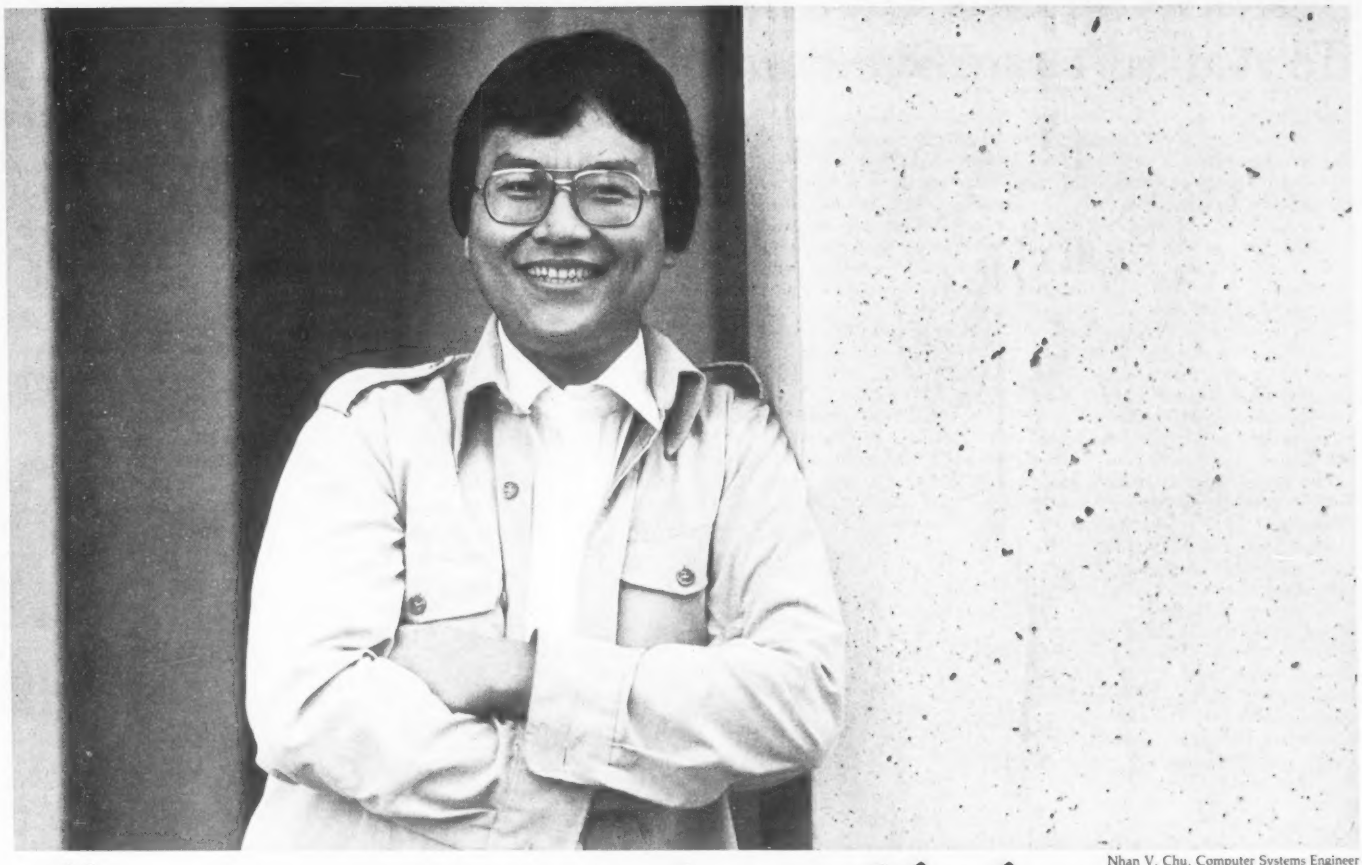
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Special to CW

The approach followed by Joan M. Greenbaum in her book *In the Name of Efficiency* ["Book Raps DP Practices, Management," CW, Aug. 6] leaves something to be desired.

Greenbaum directs her criticisms at technological developments as a partial cause of poor management. She specifically singles out such recent developments as structured "activities" and on-line CRT-based programming shops for criticism.

When I was a programmer back in the early 1960s, we had no on-line programming, nor did we utilize a structured approach to our work. However, the problems she defines as if they were new and unique to today's environments were very common then. In other words, these recent technological changes are not the cause of mismanagement.

Poor DP practices can't be blamed on new hardware or software techniques. The undesirable aspects of management can only be blamed on poor leadership qualities in managers. A good manager can adapt to new technologies. He can adjust the pace of work to accomplish some of the goals Greenbaum proposes.

Four 'Treatises'

Let me propose some treatises: 1) Technological change is not the root cause of worse management. 2) Structured activities do not demoralize the staff. 3) Efficiencies in operation do not of themselves reduce men to unskilled clerks. 4) Subdividing thoughts and actions does not "attack the individual at the very roots of his life" — as Greenbaum quotes Karl Marx.

My treatises contradict Greenbaum. And I would like to suggest that the reason they do is that management can function independently of a given system. Good management practices existed in ancient Egypt as did poor management practices. The recent technological developments Greenbaum attacks are totally irrelevant to the issues of any worsening DP practices.

I believe the relevant issues of DP practices and management concern attitude, common sense, good basic understanding of psychology and, last but not least, good training in DP and management science.

A good manager can operate in the new environment Greenbaum criticizes. There are many proven ways to adjust people's workloads when new technologies appear to threaten human dignity.

In a response such as this, there is not sufficient space to go into all the possible ways good managers can adjust to the new technologies, but let me mention a few.

1) The best teacher I had (who managed the classroom I was in) possessed dignity, but at the same time he was a true servant — serving me and the other students. A good manager must incorporate the "division of work" philosophy while at the same time striving to minimize the risks of excessive control and class distinctions.

2) A good manager can project a "father" image, a "brother" image and a "firm but fair boss" image all at the same time. Would such a good manager do some of the things Greenbaum said are going on in DP shops? How can top management put up with managers described by Greenbaum?

The only explanation I can offer is that in some organizations the philosophy of management starts at the top. If top management views its middle manager as cattle in some kind of corporate pen, these middle managers will in turn treat their people the same way. A lack of dignity and brotherhood is the root cause of poor DP practices and management.

Parks is an assistant professor of information systems management at the State University College at Buffalo, N.Y.

Checklist May Pinpoint Problems

WESTLAKE VILLAGE, Calif. — "Are you ready for a methodology?"

That's a question a lot of DP managers face, especially when things aren't going as well as they should be. The question is also the name of a checklist that might just get the disorganized DP operation back on the track.

The checklist is offered free by Spectrum International, Inc. to help DP managers determine their need and state of readiness for a formal project management/systems development methodology.

Past and Future

The checklist cites two dozen or more situations and asks the user to place each on a three- or four-point scale. The result of this exercise is that historical problems are pinpointed and potential future problems are identified, including timing and environmental considerations, a spokesman said.

Instructions on how to interpret the results are also included and, when most of the situations in any given category have been scored toward the unstable end of the scale, it's not surprising the guide indicates it is time to at least evaluate methodologies.

But it is also in this "how-to-interpret" section that the checklist acknowledges, even warns, that if certain conditions exist "it might be best to delay evaluating methodologies until things have settled down a bit."

The "Are You Ready?" checklist is available from Spectrum's regional sales office at 32107 Lindero Canyon Road, Suite 218, Westlake Village, Calif. 91361.

IEBGENER Usage Shown

VALLEY FORGE, Pa. — An SMF analysis program that reports IEBGENER resource utilization in IBM OS/MVT, OS/VS1 and MVS environments is available free from Management and Computer Services, Inc. (Macs). The program works with SMF Type 4 data and shows number of executions, CPU time and elapsed time for the IBM utility.

Resource Hog

In offering the program, Macs claimed that file copying — often handled by IEBGENER — is quite generally rated as the second most heavily used activity, behind sorting, and frequently is one of the top resource consumers.

Comparison Offered

With the analysis package, users can pinpoint the amount of time the IBM software takes. Not surprisingly, the Macs package compares the IEBGENER consumption to that of Copymacs, the company's own product, which is said to use considerably less time — and resources — for the copy function.

The analysis program is available from Macs at 74 Great Valley Corporate Center, Valley Forge, Pa. 19482.

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Specific requirements for this year's three separate examinations in Business, Scientific, or Systems Programming are detailed in the "Certificate in Computer Programming Examination Announcement and Study Guide." The study guide and application form for the 1979 examination are available on request from ICCP.

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Data Base Lists Thousands of Parts

Building Equipment Located Via Net

By Jay Woodruff
CW Staff

FORT DODGE, Iowa — Rapid increases in the cost of construction equipment have spurred many contractors to consider repairing their older equipment instead of replacing it.

To reduce equipment downtime, contractors may be able to take advantage of a message-switching network called Tele-Equip that connects a nationwide group of 60 distributors of new and used construction parts and equipment.

In addition to communicating with each other, distributors can access Tele-Equip's newly established data base listing of several thousand pieces of machinery and parts, from complete engines to transmission casings.

Each distributor pays a flat monthly fee to Tele-Equip, which provides a Teletype Corp. 4320 KSR printer terminal — along with everything needed to keep it running — and unlimited time on-line to access the parts data base or to communicate with any distributor in the network.

The system operates 24 hours a day, seven days a week. Each terminal has been modified by Tele-Equip to operate in a polling answerback mode, and each includes two-way buffers with edit and automatic receive.

Network control and operation is provided by Tele-Equip's parent company, Hot Line, Inc., publisher of trade papers, some of which are aimed at the construction industry, according to Tele-Equip manager R.S. Quealy.

Line work and switching is handled by modified IBM 2702 line controllers connected to one of a pair of IBM 360/40 mainframes with 256K bytes of memory.

Two Kinds of Service

Tele-Equip provides users with access to two kinds of service: its own listing of heavy equipment culled from a number of sources, including advertisements placed in Hot Line's own publications; and the ability to contact equipment dealers to find parts or full operating machinery.

Tele-Equip maintains a data base equipment file that is updated every 30 days. Duplication of a listing is unlikely because each piece is listed by serial number. If one of the Tele-Equip staff attempts to input a listing on a piece of equipment whose serial number is already listed, the item is skipped, Quealy said.

To access the file, a construction equipment dealer asks for a manufacturer's name

(Continued on Page 32)

NBS Seeks Output Of Organizations

WASHINGTON, D.C. — The U.S. Commerce Department's National Bureau of Standards (NBS) is seeking organizations with research and development capabilities for help in:

- Assessing the current types and structures of network protocols
- Developing guidelines, standards and protocol specification and verification techniques.
- Evaluating user protocol requirements.

The NBS will soon be soliciting proposals for specific projects in those areas.

Organizations interested in contributing are invited to send brief descriptions of their capabilities, key technical personnel and recent related activities to J.A. Brooks, Systems and Network Architecture Division, NBS, B218 Technology, Washington, D.C.

Fireman's Fund Net Douses Blaze of Operational Snags

Special to CW

SAN RAFAEL, Calif. — "Prompt, efficient service to the user" is the watchword among those who manage the extensive data communications network at Fireman's Fund Insurance Companies.

The focal point for the nationwide branch office network and all of its components is the firm's Netwrok Service Center (NSC) here. The NSC possesses the ability to resolve most routine operational problems and the authority to muster whatever additional outside resources are required on a moment's notice.

Service is defined in its broadcast sense at the NSC, according to Ben Bevis, assistant vice-president responsible for all aspects of the development of the distributed network. Bevis' job also involve coordinating the installation, testing and acceptance of all network facilities, as well as continuous training for the operators of Computer Automation, Inc.'s Syfa network processing systems, which are installed in the branch offices.

NSC is populated by four kinds of people: user service representatives who receive all trouble calls; hardware/telecommunications analysts; master terminal operators verses in the software that interfaces with remote processors; and administrators responsible for statistical analysis and management reporting.

User service reps, the initial contacts for all incoming calls, were recruited from the business side of branch operations and trained in computer applications rather than the other way around, Bevis explained.

These reps "understand what the caller is talking about, and that gives the people in the field a good feeling," he continued. "No matter how many people at the home office become involved in a trouble call, the same user rep stays with the problem until it is closed out."

More than half of the incoming calls in a typical month fall into the category of "continuous training." The calls might involve unexpected blinking lights, cursor loss or some anomaly caused by mistakes at the terminal keyboard.

"The user rep can usually diagnose and prescribe a quick fix in such a way that the terminal operator adds to his knowledge." If not, the user service rep must decide whether the trouble relates to hardware, application software or "unknown" causes and then start a highly-formalized incident-reporting process, Bevis said.

Software 'Incidents'

An applications software incident will often bring in support from the applications group within the firm's distributed systems department.

"Perhaps one of the most important aspects of our many years of preplanning," applications manager Sam Houston observed, "is that all software releases are stringently controlled from the home office, which means we are 100% sure that whatever is running in the field is an exact duplicate of our master here.

"We won't even let our software people carry a compiler to the field for fear some lack of uniformity might slip into a branch program."

Houston's group can attempt to simulate the trouble on the NSC's Syfa system or it can dial-up the branch and take control of the branch office processor remotely. If the cure requires a change to the software, a new version can be down-line loaded over the telephone line.

"That also means that the same update must be down-line loaded to every other Syfa in the network, Houston pointed out.

More serious software problems require different responses, he continued. "If the operating system is the source, for example, we have to convene a task force of represen-

(Continued on Page 32)

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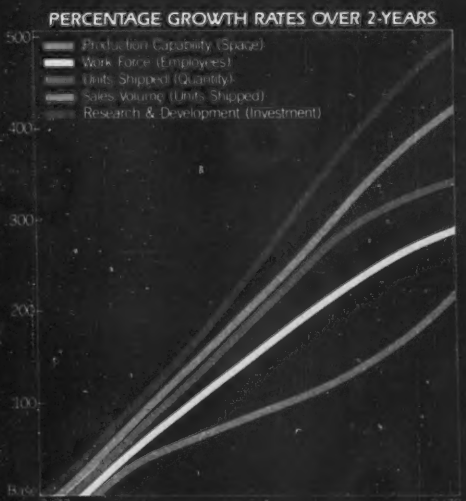
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Voice Response Unit Unwrapped by Votrax

TROY, Mich. — A microprocessor-based voice response system is available from Votrax for such applications as data entry or ordering parts over Touch-Tone-type telephones.

The Votrax LVM-80 provides multiline output for four to 64 phone lines, along with data input handling ability for microcomputers, minicomputers and large business mainframes. Vocabulary capacity, selectable by the user, ranges from 16 seconds to 512 seconds of addressable speech. A maximum capacity of 16K bytes of erasable programmable read-only memory is available, Votrax said.

The LVM-80 can "speak" words and phrases with a quality that is said to be "virtually indistinguishable" from that of the orginal speaker, whose voice is previously recorded, digitized and stored in the form of individually addressable messages.

Votrax systems are already used in manufacturing operations for quality control and equipment monitoring and by the banking industry for electronic funds transfer, point-of-sale applications and credit verification, according to a Votrax spokesman.

Additional features include variable word and message length and custom vocabulary consisting of words, phrases and voice of the user's choosing. A variety of communications data sets are supported including Bell 407A, 407B, several 403-type units and AT&T's MFR.

The LVM-80 is fully compatible with Bell Transaction Telephone, Automatic Call Distributor and Call Director, according to Votrax.

The basic LVM-80 with 16 seconds of speech and the capacity to handle four telephone lines simultaneously, costs $8,750.

Votrax is a division of Federal Screw Works, 500 Stephenson Highway, Troy, Mich. 48404.

Adage Adds High-Speed Remote Option

BOSTON — An option for Adage, Inc. terminal controllers allows full-duplex remote connection of interactive graphics terminals to IBM-compatible mainframes at 1.544M bit/sec.

For use with telephone "T1" lines, the capability "will permit users of high-speed interactive terminals to retain the access speed to a central data base required by sophisticated [computer-aided design and computer-aided manufacturing] programs located many miles away," according to Adage.

Adage terminal controllers are claimed to buffer all data for retransmission in the event errors occur, augmenting reliability and data base accuracy. The "T1" connection is available on the Adage 4250 controller — an IBM 3250 emulator — and on the Adage 4370, a three-dimensional graphics terminal for IBM-compatible mainframes.

The option costs $800 as installed in an Adage terminal controller and works for all terminals atached to the controller, according to a vendor spokesman. Adage has not yet established the cost for retrofitting existing controllers to accept the option.

Adage is located at 1079 Commonwealth Ave., Boston, Mass. 02215.



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  1. Operators must be continually aware of, and monitor, which system "owns" each device. This distracts operators from other, more productive, activity.
  2. As a MANUAL process, it is subject to HUMAN error:
     A CONSERVATIVE error, where the device is inadvertantly made *inaccessible* to ALL systems, is simply wasteful. You lose use of a resource for which you are paying good money.
     On the other hand, if a device is inadvertantly made accessible to MORE THAN ONE system, then jobs in DIFFERENT systems may simultaneously be allocated the SAME TAPE DRIVE. This can result in a number of serious conditions, including:
     a. One or ALL of these jobs may ABEND. This creates irate users, lost production time, and unnecessary re-runs, (ie., confusion).
     b. Depending on your operating techniques, an input tape (history tape) might be over-written.
     c. Data written by one or both programs might be incorrectly recorded, lost or jumbled. This garbaged data may not be immediately discovered, and might not crop up again until months later—when you least expect it.
  3. Because human response is slow by computer standards, your overall throughput may be impeded because tape allocations require operation interaction.
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  2. Your systems will run more smoothly with fewer user and operator headaches—a substantial burden is lifted from the shoulders of your personnel.
  3. Your throughput may be increased—this is the direct result of decreased operator interaction and improved utilization of your TAPE resources. Responsibility is returned to the "system", where it belongs.
  4. You may be able to actually eliminate tape drives—more likely you can defer upcoming requirements.

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  MSM does not require that your operators learn any new techniques.
- **MSM CAN BE INSTALLED IN 10 MINUTES—NO IPL IS REQUIRED, NOT EVEN A QUIESCE.**
  It is just as simple to install MSM as MSI (possibly simpler). After spending 15 minutes with the documentation, it can be installed and operational in 5 or 10 minutes.
- **MSM IS IMPLEMENTED WITH ABSOLUTELY NO MODIFICATIONS WHATSOEVER TO YOUR SYSTEM (or to any other software).**
- **MSM REQUIRES NO ADDITIONAL HARDWARE—YOUR SYSTEM AS IT IS TODAY IS SUFFICIENT**
  Assuming you can support Super-MSI, you can run MSM. Super-MSI requires that your systems be linked through a SHARED DASD communication table.
- **MSM USES ONLY AN INSIGNIFICANT AMOUNT OF ADDITIONAL OVERHEAD—SAY ½%.**
- **ALTHOUGH MSM IS CURRENTLY AVAILABLE ONLY FOR MVS ENVIRONMENTS, SUPPORT FOR OTHER SYSTEMS (SVS, MVT, VS1 AND MFT) IS EXPECTED TO BE ANNOUNCED SOON.**
- **MSM AUGMENTS, BUT DOES NOT INTERFERE WITH OR MODIFY STANDARD SYSTEM ALGORITHMS.**
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Net Design Seminars Set

POTOMAC, Md. — Three-day workshops focusing on "Data Communications Network Design" and sponsored by the Institute for Science and Public Affairs (Ispa) will be held in Boston, Denver and Los Angeles during the next several weeks.

Aimed at DP professionals, scientists and managers, the seminars are intended to provide the latest information on such topics as message switching, data concentration, communications equipment and data carriers, network architectures, packet switching, network protocols, network diagnostics and communications software.

Ispa gave a list of four speakers, noting that not all four will appear at each seminar. The speakers include Robert M. Linebarger, a computer scientist at the National Aeronautics and Space Administration's Ames Research Center in Palo Alto, Calif.; Dan Zatyko, a developer of distributed processing networks and a contributor to Auerbach Publishers, Inc. reports; Bob Crawford, president of AMC Enterprises, who has contributed to a number of federal projects in data communications; and Stephen W. Frankel, vice-president of Computer Transmission Corp. in Los Angeles.

The seminars are slated for Sept. 10-12 at Boston's Lenox Hotel; Sept. 24-26 at Denver's Cosmopolitan Hotel; and Oct. 15-17 at Los Angeles' Hyatt House Hotel. Registration fees are $525 per person.

More information is available from Ispa's Washington Education Division at 10006 Falls Road, Potomac, Md. 20854.

Harris Upgrades Terminals

DALLAS — Users of Harris Corp.'s 8000 series of IBM- and Univac-compatible interactive terminals can now upgrade to the Harris 1670 distributed data processing (DDP) system via the firm's recently introduced upgrade kit.

Billed as a cost-effective alternative to mainframe expansion, the upgrade kit allows the user to offload many tasks originally done on the mainframe to remote 1670 sites.

There is no charge for the upgrade feature itself. However, a $210 field installation charge is assessed along with the cost of the peripheral devices and the firm's 1600 processor, introduced about 18 months ago.

Those users with 8171 (IBM-compatible) or 8210 (Univac-compatible) communications controllers can take advantage of the upgrade, according to Harris.

The 1670 DDP system can reportedly perform data entry, local and remote batch processing, local and remote inquiry/response and file updates concurrently. Through the use of switchable keystations attached locally to the 1670, operators can switch between host mainframe and 1670 interaction by pressing a key on the keyboard, Harris claimed.

More information is available from the Data Communications Division, 16001 Dallas Pkwy., P.O. Box 400010, Dallas, Texas 75240.

Modems Offered For IBM 3600s

MIAMI — Racal-Milgo, Inc. has announced two modems for use with IBM 3600 financial communications loop systems.

The 12 LMS and 24 LMS modems run at 1,200- and 2,400 bit/sec and serve as direct replacements for the IBM 3603 terminal access unit, according to Racal-Milgo. This loop modem series is said to feature automatic central site modification of network problems; fault isolation at unattended remote sites; and restoration of failed network components when used with Racal-Milgo's Model 185 network diagnostic controller or System 200 network management center.

An automatic alarm reporting feature in either unit alerts the central site operator to loop malfunctions, the vendor said. The central operator can then interact with the required modems without assistance from remote personnel.

Defective Equipment Removed

Moreover, restoration features reportedly allow the central operator to remove defective equipment at an unattended remote drop from the loop while allowing the remaining drops in the loop to function normally.

Further, both the 12 LMS and 24 LMS permit the central operator to initiate loop tests for rapid fault isolation, Racal-Milgo said. Dial backup capabilities allow the central operators to down-line load dial-up calls, with the appropriate modems initiating and answering the calls.

The 12 LMS and 24 LMS cost $2,110 and $2,650, respectively, or can be leased for $67/mo and $84/mo, respectively. Racal-Milgo is at 8600 N.W. St., Miami, Fla. 33166.



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ITEL

Builders Locate Equipment, Spares Via Net

(Continued from Page 27)
and the model number of the part. After searching its data base, the Tele-Equip system will print out all the models that meet the request along with their serial numbers, asking prices and the phone numbers of the sellers.

If the dealer wants more information on any one of the pieces listed, the serial number of that unit is typed into the terminal again and the computer replies with whatever other information is available including vendor's comments on the gear and a list of whatever peripheral equipment will be included in the sale, according to Quealy.

The dealer can contact any or all of the 60 dealers participating in the network, and the message will arrive to its destination within one minute. If a dealer in Southern Texas needs an attachment for a dump truck, he can poll every dealer in the network or simply the ones known to carry such items.

Heavy System Use

According to Mina Frappier, a teletypewriter terminal operator at East Hartford Equipment Co., Inc. in East Hartford, Conn., the Tele-Equip system gets a lot of use.

"Every day, we get customers calling for parts, and if we don't we have them we type a message to everybody unless I know somebody specifically who would have it.

Items such as a front idler for a very new or very old Caterpiller tractor, she explained, are rarely available in stock. The network system is useful for finding such items.

Callers ask for everything from tires to huge diesel motors. If the part can be purchased used, the customer stands to save from 50% to 60% of the cost of a new part, and Frappier estimated she can help find used parts 10% of the time. "Otherwise, it's new parts or a new machine," she noted.

If a part or piece of equipment is shipped from one dealer to another, the network is used to record purchase numbers, shipping instructions, routing and the unit's price, according to Quealy.

When Hot Line acquires an IBM 4300 series mainframe in October, Tele-Equip will transfer its data base to it. The two 360/40s now in operation were being "swamped" by the parent company's growing publishing operations. They will soon be used to back up the 4300.

Quealy described the service that Tele-Equip offers as a miniature telephone company. "We provide everything: communications lines, terminals, paper and ribbons. When a contractor needs to repair or replace an expensive tractor, rapid communication between reliable companies can usually solve the problem in minutes."

Net Handles Operational Snags

(Continued from Page 27)
tatives from several groups."

In pursuit of unknown problems either at the mainframe or the branch processor, the analyst can call in experts from Fireman's Fund's equipment planning group, technical staff or mainframe programming groups. As a last resort, the analyst has the authority to call in a vendor service representative, and from that point forward the NSC analyst turns into a highly impatient timekeeper.

If the hardware analyst decides to call CA for support, he doesn't have far to go. The vendor maintains a full-time network coordinator to support the NSC. Reflecting a maintenance policy created specifically for the network processing environment, the coordinator maintains a small network service center of his own, equipped with a Syfa information station and a 1,200 bit/sec modem that gives him access to any processor in the network.

"Our basic job is to monitor continuously overall network performance, in a preventive sense, and to assist Fireman's Fund management with any aspect of implementation that requires CA's direct participation on a day-to-day basis," Ken Klucsor, the resident CA analyst, explained.

But when a formal vendor call comes from the NSC, Klucsor has to decide in a hurry what course of action to take. If remote access with the branch processor is possible, he can dial-up the computer and see what the local operator is seeing.

Klucsor can also access the data base remotely from CA's service center to see if any similar symptoms have occurred on any other Syfa system anywhere in the world.

If the current trouble call exhibits unusual characteristics, Klucsor may want the technical staff at the company's Irvine, Calif., headquarters to take a look, which might mean transmitting a memory dump from the branch office to a Syfa system in Irvine for detailed analysis. He can do this from San Rafael without any intervention whatsoever in branch operations.

If a bug cannot be detected in the Syfa system, the CA rep will coordinate further action with the NSC's personnel. They can turn to the NSC's master terminal operator, who is a specialist in IBM software including Time-Sharing Option (TSO), Information Management System (IMS), Virtual Telecommunications Access Method (Vtam) and Job Entry System (JES). The NSC hardware coordinator has the option of dispatching IBM and Bell System service representatives.

But the NSC is not altogether a reactive group fully occupied with trouble calls, Bevis noted. The user service reps, for example, have to know what applications are running in the field and all of the regular data transactions transpiring between the branches and the home office.

If a regularly scheduled report is late coming in, the reps find out why. They also check to see that data is complete and properly formatted. They assess priorities and demand for host processor time and, above all else, are charged with preventing any mushrooming of simple problems into major ones.

Overall, the program development and implementation phase, now in its second year, is on schedule, according to Bevis. So far, 45 Syfa systems have been installed, with 18 more scheduled in 1979. When completed, it will encompass 49 branch offices, auxiliary processing centers, a program development and training center in San Rafael and the NSC.

The company plans to install IBM's System's Network Architecture/Synchronous Data Link Control (SNA/SDLC) software on three 370/168 host computers, which will provide interactive network control via leased lines.

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As Vendor Faces Setback

Itel Problems Don't Worry Users: Poll

By a CW Staff Writer

NEWTON, Mass. — Users of Itel Corp. plug-compatible mainframes appear generally unconcerned by the firm's well-publicized financial difficulties, according to an informal, random poll taken recently by telephone.

In recent months, Itel has dismissed about 500 employees, has undergone several reorganizations in its computer divisions and has temporarily shelved its plans to bring out a new computer [CW, Aug. 6]. In addition, the firm's earnings are expected to be sharply lower this quarter, a situation industry observers attribute partly to the introduction of the IBM 4300 systems.

Rand McNally & Co. of Chicago is going forward with its investigation into upgrading its system to an Itel AS/6, according to Frank Stubblefield Jr., director of information services for the firm.

Stubblefield, vice-president of Choice, the recently formed Itel user group, commented, "I think Itel has definitely had some problems, but it's approaching the resolution of its problems in a very businesslike manner. I feel its becoming a leaner fighting machine . . . . I think [Itel will] be able to compete very well in the market."

In addition, Stephen Gerbsman, president of the firm's Computer Systems Division, has been visiting Itel users to reassure them of the firm's basic stability, Stubblefield said.

Neither Stubblefield nor any other users contacted mentioned any deterioration in the service they are receiving from Itel. For example, Lawson Roberts, chief administrator of U-Haul in Phoenix, said, "I have seen no change in the quantity or quality of service we get from Itel. We are confident of Itel's ability to keep supporting us." He added that he had heard reports that the banking community has a fair degree of confidence Itel will weather the storm.

One user even said some positive aspects to the firm's retrenchments. "The fact that Itel let go 500 people to me is not a danger signal. It just means that probably it was just overextended; I don't feel at all threatened," Chuck Allen, director of computer services and management systems for the Maricopa County Community College District in Phoenix, said.

Although virtually every Itel user contacted in the survey knew of other Itel users, none could site any who were getting nervous about the firm's prospects.

Virtually the only discordant note came from Patrick Ryan of the Illinois Central Gulf Railroad Co. in Chicago. "Of course, we are concerned," he said, "but I spoke with the local branch manager and Gerbsman, who was very honest and open and gave me the impression he would do what has to be done."

At Junior College

CPU Serves as Counseling Tool

By a CW Staff Writer

TYLER, Texas — Students at Tyler Junior College here can no longer stump guidance counselor Thomas Tooker with questions he can't answer.

For the past 13 years, students would ask him questions like, "How much does a bricklayer earn?" Or, "How much does a lathe operator make? And what is the occupational outlook for that job?"

Now, when students come up with questions like these, Tooker just turns to his computer for the answer. "It could take me a week to find the answers to some of the kids' questions without the system. Now, it takes me about 8.5 seconds to get a complete rundown on everything a student wants to know," Tooker said in a recent interview. "It's the best counseling tool I've had in my 13 years here."

The object of Tooker's affections is an IBM 370/138 that was recently installed in the college's DP center. The 1M-byte system replaced a 256K-byte 370/125 the college had acquired only recently, and the 138 will itself be replaced shortly with an IBM 4341.

The system, which does all the school's processing, is connected to 23 IBM 3277 CRTs around the campus and is used by students, administrators and professors in academic courses.

Tyler's upgrade comes in the midst of a nationwide belt-tightening that has managed to bypass this school. "Tyler Junior College is sitting right in the middle of a real good tax district, and we're state-supported, too. Our enrollment has grown by about 10% a year, and things look good right now — despite Proposition 13. I don't worry about funding — I just ask the people in the financial office and let them decide."

Tooker noted that the funding is also easy to get because the system is popular with the school's administration.

"The administration sees this as a good tool — it's fast and accurate, and you don't have to fool with a bunch of papers," he explained. "Since the school's business manager sent me to a seminar on DP about three years ago, the school has encouraged me to go ahead and do what I need to do to get things functioning real well," he reported.

As an example, Tooker cited the wealth of information he can pull together rapidly for a student.

"If a kid takes one of the standard vocational tests we use for guidance purposes, I can give him the results in less than 30 minutes, complete with descriptions of perhaps 15 different jobs including the annual salary, job outlook and all the characteristics

(Continued on Page 38)

Floating Point Ships 1,000th Array Processor

BEAVERTON, Ore. — Floating Point Systems has shipped its 1,000th array processor computer, the firm announced. The system will be attached to an IBM 3033 at the Chevron Geophysical Co. of Houston.

The AP-190L array processor is a specialized system for scientific DP applications. It is used extensively for scientific DP applications involving heavy amounts of "number crunching," and several such processors are already in use at the Houston location.

The combination of a specialized array processor with a large host computer gives users high-speed performance for computationally intensive operations, the firm explained, while the host is used for operations more appropriate to its own architecture and instruction set.

The quest by scientists for addi-

(Continued on Page 38)

Top Quarterback in the EDP

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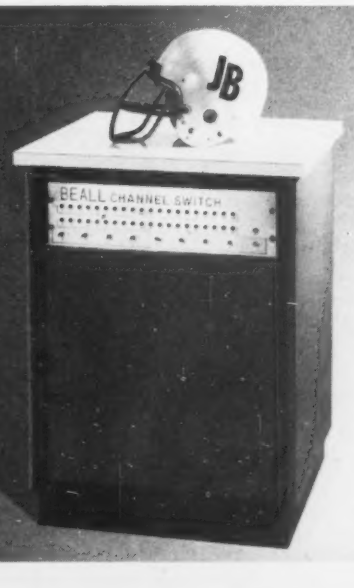
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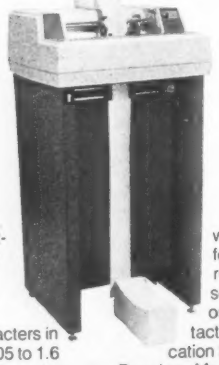
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Dennison
Industrial Systems

Spur Announces Tester Kit To Fix Printer Controller

By Tom Henkel
CW Staff

LOS ANGELES — If you can read, you can probably fix your controller. But if you can't fix it, someone will do it for you.

That's the latest service option offered by Spur Products Corp., a manufacturer of controllers that allow IBM 1403 printers to interface with non-IBM CPUs.

For $75 a month, Spur will give you a do-it-yourself tester-exerciser kit, complete with directions and a bundle of spare parts. If your controller goes down, attach the tester, find out where the problem is and replace the part.

If you find you can't fix it, Spur will send one of its technicians within 24 hours to fix the controller for you, according to Ray Lorenz, president of the company.

"We sort of evolved into the thing. it started in remote areas where they would have liked to have the IBM 1403, but IBM wouldn't call for service on our part of the controller. We were stuck with either not making the sale or coming up with an alternative.

"When we designed the controller, we designed the tester at the same time. The tester is capable of isolating the controller from the rest of the system. Almost anyone who can read can narrow [the trouble] down to a problem area in the controller," Lorenz said.

"We charge the customer a flat fee. This guarantees that we will furnish a tester and a complement of spare parts on-site. If his own people get in such a rut they can't fix it with the tester or through conversations [with Spur] on the telephone, we will send out a plant engineer to bail them out.

"Since we started this thing back in August, we've only made two trips back to the field," according to Lorenz.

Sorbus, Sirvess Service

Spur will also provide the customer's technical personnel with the factory support provided by Sorbus, Inc. and Sirvess, Inc., Spur's national service representatives. However, Lorenz said, the Sorbus and Sirvess support will cost between $125 and $150 a month. The user can also opt to buy the tester and spare parts set for $6,000.

"The $75 a month is an insurance policy," Lorenz said. The user "is spending $75 a month that he won't have to spend somewhere downstream. If he's doing his own service [and buys the test equipment and parts] and he should then require factory backup, we would charge him $250 a day plus traveling expenses.

"To date, we've never had to provide support where [the user owns] the spares and tester.

"Where the person is paying $75 a month, we've only had two situations where we've gone to the field to provide support," Lorenz continued. "In one case, the guy who had been trained on the system had quit, so they didn't have a trained guy."

Users must take the Spur do-it-yourself contract for at least one year. In addition to the $75 monthly charge, a $25 surcharge is added for facilities that are long distances from major airports. No contract is necessary if the user buys the tester and spare parts package, Lorenz noted.

Under the leasing arrangement, Spur will replace any boards used from the spares package. If the user buys the testing system, Spur will rebuild broken boards at less than 50% of the cost of new replacements, according to Lorenz.

"Six of our users are already doing their own service. Our users, who include Bell Laboratories and the University of New Hampshire, all have in-house technical expertise," Lorenz said.

Dealing With IBM

How does IBM feel about users fixing controllers attached to their printers?

"IBM doesn't pose a problem. It takes care of the printer if the customer wants it to. Some users prefer to have the printer and controller under the same maintenance to keep from finger-pointing. If [the user wants] that, it must take either Sorbus or Serviss to maintain both of them.

"A good many of the users prefer IBM on the printer, and we either get Sorbus, Serviss or the user itself to maintain the controller. This has worked out reasonably; we haven't had much problem on it," Lorenz stated.

"Usually, the problem is fairly clear-cut. The printer is an electromechanical device — there are no electronics in the thing. The failure is normally in the computer.

"IBM is better to work with in that respect than a lot of manufacturers. It's not opposed to making some changes when you tell it changes are needed. IBM doesn't argue as much as some of the other vendors we get involved with do," Lorenz said.

Reader Projects COM Image

SAN DIEGO — The Datamate 200 dual-page microfiche reader introduced by Datagraphix, Inc. was designed to project either two 8.5- by 11-in. source document pages or a single, full-size computer output microfiche (COM) image.

The $265 unit features magnifications of 24X, 42X or 48X, as well as a dual-position lens mount. Magnification powers can be switched without changing optics, a spokesman said.

The Datamate 200 is backed by a 36-mo limited warranty and the company's 24-hour customer service hot line, he noted. Datagraphix can be reached at P.O. Box 82449, San Diego, Calif. 92138.



'For the Answer to That Question I Must Go Into My Cave and Meditate.'

Advertisement

DP Dialogue

Notes and observations from the IBM Data Processing Division that may prove of interest to DP professionals

Coffee to Go: Customer Order System Starts up Fast

"We created our online customer order processing system with just four programmer-analysts. It took only 15 months from the inception of the project to startup of the system nationally."

Frank Pinkela is manager of the Information Systems Department of Hills Bros. Coffee, Incorporated, San Francisco, one of the oldest and largest purveyors of coffee in the United States. He is describing his company's new transaction-oriented system, which supports a nationwide network of terminals.

"It permitted us to cut the time between receipt of an order and mailing the invoice by 14 days, taking $3 million out of our receivables float," Pinkela notes.

"We tightened inventory from a four or five week supply down to 3½ to 4 weeks; at the same time we raised the customer service level from 96 to 99 percent," says Allen Weitzel, corporate distribution manager.

"We previously had a card-oriented batch system," Pinkela continues. "So we had to write online programs from scratch, including support for our terminal network. We could not have done it in so brief a time without DL/1 and CICS."

Data Language/1 (DL/1) is an IBM data base manager that organizes and stores the data for any number of application programs. The Customer Information Control System/Virtual Storage (CICS/VS), also an IBM program product, complements DL/1 by handling the details of transaction processing and terminal support.

Programmers at Hills Bros. worked at IBM 3277 Visual Display Stations to develop the system, using Source Program Maintenance Online (SPMOL). This IBM program product provides for writing and editing of a program directly at a terminal, and submitting it to the batch stream for compilation and execution.

"SPMOL increased our programmer productivity by 50 percent," Pinkela says. "They get faster turnaround on compilations, immediate diagnostics, and management of source code for test and production.

"Now that the system is up and running, we are adding to the data base for future applications such as a forecasting model and an online inquiry capability. In two years we've covered a lot of ground; today the information systems function at Hills Bros. is prepared to grow as the business grows."



At Hills Bros., experts sample coffee, then proportion the blend. In 15 months, the company implemented an online order-processing system supporting a nationwide network of terminals.

New DASD Technology for Today's Data Processing

Important innovations are resulting in lower costs for Direct Access Storage Devices (DASD), while capacities and speeds increase. These technical advances have helped to open the way for today's growth in distributed systems and online transaction-based processing.

One such DASD product is the 3310 for smaller systems. Its new disk, approximately eight inches in diameter, holds 5.85 million bytes of data per surface – at a greater density than any previous IBM 14-inch disk. In a sealed disk-and-actuator unit of approximately two cubic feet, a spindle drives six disks with a capacity of 64.5 megabytes.



The 3310 savings are significant. It brings the monthly cost per megabyte for small-system DASD's down to the range of $4 to $5. And its smallest configuration costs less than the previous entry-level data-base file – the 3340. There are energy savings too. It uses 76 percent less power and generates 84 percent less heat per megabyte than the 3340.

New for Intermediate Systems

In the intermediate systems size range, the new 3370 DASD more than doubles the density of storage in bits per square inch of today's IBM DASD. A new head technology using semiconductor processes allows this significant increase in recording density. The read-write head "flies" over the disk on a cushion of air so thin it is like piloting a jumbo jet around the world at an altitude of one foot.

The base unit of the 3370 holds 571 megabytes at a cost as little as $1.05 a month per megabyte. This compares with $1.57 to $5.71, depending on size, for earlier DASD.

Compared to the 3340/44, the 3370 stores over twice the data per square foot of floor space, and over twice the data per watt of power consumed. Average access time is 20 milliseconds, compared to 25, and the data transfer rate is 1.86 megabytes per second, instead of 0.885.

One innovation in the 3370 is novel dual actuators, which serve to position two independent sets of read-write heads. The dual actuators economically permit more transactions per second against the data on a single spindle. And a new "fixed block" architecture using a more effective command set reduces interactions between the control unit and the storage devices.

The 3310 and 3370, both with error-correcting code, also set new standards of reliable performance. The 3310 storage element is a simple, sturdy sealed unit, with fewer moving parts, that needs no scheduled maintenance.

For the intermediate-system 3370, there is a new portable maintenance unit – a "computer in a briefcase" – that guides the customer engineer through the diagnostic process, performing trouble analysis automatically.

These units set new standards of reliability and energy efficiency. And their storage density, speed, and economy are fundamental to today's exciting innovations in data processing.

A "clean room" held to a unique standard of freedom from contamination is required for final preparation of IBM's new eight-inch disk for the 3310 DASD.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

HP ends the distributed

With Hewlett-Packard, you can put the right computers in the right places, right now. Without compromising your future networking needs.

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Working the way you work.

For general purpose computing, manufacturing administration or automation in the factory and lab, HP computer products are extremely flexible and easy to use. Your departmental personnel won't have to become computer experts to operate them. Some models, for example, have special keys right on the console to guide the user step-by-step through his job. Specialized HP applications packages can give your materials manager direct control of his inventory and order planning or even let him set up a factory data collection system—without any computer experience. And HP's family of engineering and scientific computer products provides the tools you need for sophisticated computation, measurement, and testing jobs.

Need yesterday's production figures right away? HP's award-winning IMAGE data base management system includes an interactive inquiry language that lets you generate useful business and manufacturing reports with just a few simple keystrokes. There's an IMAGE





HP 250 The HP 250 is a powerful small business computer that has a typewriter-like keyboard and an adjustable video screen with eight programmable "soft keys" to make the user feel right at home. Priced from $23,500, the HP 250 can support five local terminals and even act as a terminal for the HP 3000.

HP 300 Advanced Hewlett-Packard technology has packed an impressive amount of capabilities into the HP 300, a business computer designed especially to handle specific departmental jobs like order entry, customer files or personnel records. Priced from $36,500, the HP 300 can accommodate 16 users from an innovative display console that simplifies operating and programming the system.

processing compromise.

software package for each of the HP computers, so that whatever system you choose, you can get the information you need, when you need it.

Your programming staff will appreciate the special software features that make their job easier, too. On HP systems, program development can be done on-line, so that new and modified programs are up and running in minimum time.

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HP 3000 The HP 3000 Family is Hewlett-Packard's most powerful business computer line. Both the Series III (pictured above) and the Series 33 use MPE-III, a multiprogramming operating system that facilitates on-line transaction processing at terminals throughout your company. The Series 33 (which can support up to 32 terminals) is priced from $58,500, while the Series III (64 terminals) starts at $105,000.

HP 1000 The HP 1000 Systems Family consists of five upward-compatible models (from $20,000 to $100,000) designed to meet the diverse needs of engineering and manufacturing environments. All use HP's powerful RTE operating systems, and the HP-IB interface bus lets you monitor and process data from over 200 Hewlett-Packard instruments.

Memory Aimed At CDC Units

POUGHKEEPSIE, N.Y. — Intermem Corp. has introduced a replacement memory system for Control Data Corp. Series 6000, Cyber 70 and Cyber 170 processors.

The Intermem 8640 provides up to six million words of extended memory for those systems and is completely hardware- and software-compatible with those processors, according to the firm.

The air-cooled, semiconductor-based memory has four I/O channels, each of which may interface with either a CPU or distributive data path. In addition, the unit has an independent 10 MHz system clock with battery-backup powering.

The unit features an access speed of 250 nsec and a cycle time of 450 nsec, a spokesman said, and is available in sizes from 512K words to six million words. Data rate is 10 million word/sec, the spokesman added.

A 1M-word unit sells for $600,000, the firm said from 47 Dutchess Tnpk., Poughkeepsie, N.Y. 12603.

Trimliners Get Dual-Speed Ability

LEXINGTON, Mass. — A dual-speed capability that allows 300- and 600 line/min Trimliner printers to reduce printing speeds to 170- and 350 line/min, respectively, has been introduced by NEC Information Systems, Inc.

The feature, which will reportedly be standard on all new Trimline printers, allows users to adjust to slower speeds for higher quality reproductions.

The microcomputer-based architecture of Trimline printers reportedly permits conversion from one rate to another in about four seconds.

Both models will use Dataproducts Corp., Centronics Data Computer Corp., Data Printer and optional RS-232C/CCIT interfaces. Users can choose 48-, 64-, 96- or 128-character sets, the vendor said.

The 300 line/min model costs $5,175 and the 600 line/min version is $7,450, with OEM discounts available. A conversion kit for existing Trimline printers will also be available, but the price has not yet been announced. The vendor is at 5 Militia Drive, Lexington, Mass. 02173.



NEC Trimliner Printer

Century Unveils Power Supplies

CULVER CITY, Calif. — Century Electronics, Inc. recently introduced two ac-to-dc, 200W single-output power supplies.

Each series has five models, ranging from 5- to 48 Vdc output.

The commercial unit was designed for single-phase output with 115 Vac, 47-440 Hz. The military version is for a three-phase input 115 Vac, 400 Hz, according to the vendor.

Operating temperatures for the military series is -55°C to 100°C. Temperatures for the commercial model are between 0°C and 71°C.

Both models offer short circuit protection and self recovery and operate at an efficiency rate of 76% to 87%, depending on the output voltage, the vendor said from 5965 Washington Blvd., Culver City, Calif. 90230.

CPU Assists Counselor

(Continued from Page 33)

of the job. Information can include how much a worker has to lift, whether there's any walking or sitting, whether it's declining in this part of the country — it's just amazing how much information we can access," he said.

The idea for the system came out of an IBM seminar held on the campus three years ago. "IBM showed computers being used in counseling, and I was real impressed with some of the things that could be done," Tooker said.

"We tried several approaches to implementing this system on campus, but some of them just didn't work out. We ended up developing most of the applications ourselves," he recalled.

Other Student Applications

The vocational counseling system is only one the college uses to help students. For example, Tooker explained, the college has been able to cross-index all its courses with courses offered by most of the four-year colleges in the state. Tyler has sent its catalog to these institutions, and they have indicated which of their courses are equivalent to any at Tyler.

"A student can go anyplace on the campus, walk up to a terminal, punch in the right code, and the screen shows him these equivalents," so the student knows right away how courses can be transferred. Tyler Junior College is the only junior college right now that has this capability, Tooker asserted.

Another system enables students to consult an on-line listing of part-time jobs. The list is updated once a month and provides an easy way for students to learn of such opportunities, he noted.

In fact, almost all the information Tooker uses is contained on his system. "If I want to know who the guidance counselors at a particular school are and when the school was last visited, I can make an inquiry on the system. That tells me everything."

Array Processor Goes to Chevron

(Continued from Page 33)

tional petroleum deposits, as well as research into other forms of energy, is aided by the computer, Chevron officials said.

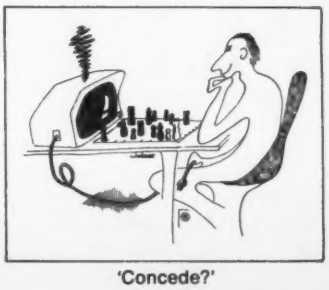
An array processor is a computer optimized in architecture and instruction set to handle programs involving computations on large batches of data, such as Fast Fourier Transforms and large matrix computations. The device takes large blocks of data and instructions from a host and performs computations at speeds many times faster than possible through the host alone. The host may then be considered the DP "front end" and the array processor the "number cruncher" processor unit.

The impact of array processors on computer technology has been twofold, the vendor explained. Such a processor can have computer power equal to or greater than that of the large, multimillion-dollar mainframe system of the computer center; and time-consuming number-crunching can be offloaded to increase the economy of a larger system.

Dema Meet Set In New Orleans

BATON ROUGE, La. — In honor of the third annual Data Entry Management Association (Dema) national conference, Gov. Edwin Edwards of Louisiana recently proclaimed Sept. 25 "Data Entry Day."

The conference, to be held in New Orleans Sept. 25-28, will include more than 40 seminars, panel discussions and hands-on workshops. This year's conference theme will be "1980s: Years of Growth in Data Entry."



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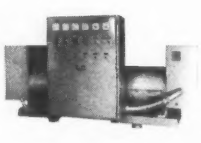
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Information 1000-, 5000-Compatible

Prime Unit Features 768K-Byte Memory

WELLESLEY HILLS, Mass. — Prime Computer, Inc. has introduced a medium-capacity computer system that features up to 768 bytes of virtual address memory space per user and is fully compatible with the firm's recently introduced Information 1000 and 5000 machines.

The Information 500 computer can support up to eight users and is said to have a 600 nsec memory access time as well as an 80 nsec cache memory. The system supports Prime's Inform, an English-like language that allows users to retrieve, update and manage data through remote or on-line terminals.

Completely Compatible

The 500 is completely compatible with other Prime computer systems, a spokesman explained. In fact, the computer — billed as a low-end supermini — can be easily upgraded to Prime's Information 1000 system.

Like the 1000 and 5000 computers, the 500 can use Prime's Primenet networking software, which allows the computer to communicate with other machines.

The system uses the Primos operating system software.

The Information 500 package is typically configured with 256K bytes of error-correcting code main memory, 96M bytes of disk storage, one system CRT console, a character printer controller and the software for a suggested price of $59,200 plus an approximate monthly maintenance fee of $543. However, a base 500 system with the same features but including 32M bytes of disk storage costs about $46,600, with a suggested maintenance price of $520/mo.

A high-end 500 computer with 512K bytes of memory, an 80M-byte removable disk pack drive, a CRT, a character printer controller, an 800 bit/in., 45 in./sec tape drive and controller and system software carries a pricetag of $70,600, plus an extra $645/mo for maintenance, the spokesman added.

Additional information on the 500 and other Prime systems can be obtained from the firm at 40 Walnut St., Wellesley Hills, Mass. 02181.

Mini Paints Promising Picture For Museum Management

By Jeffry Beeler
CW West Coast Bureau

RIVERSIDE, Calif. — An experiment in the application of minicomputers to the running of the Riverside Municipal Museum promises to yield new object-cataloging techniques that small museums with limited resources can adapt to their special day-to-day operations.

The project revolves around a Terak Corp. 8510A desktop system that the history department at the University of California (Riverside) is using to demonstrate the potential of minis in small museum management.

Earlier this year, graduate students in Dr. Ronald Tobey's museum cataloging course cataloged some 100 items in the municipal museum's antique quilt collection with the 64K-byte Terak machine. In coming years, students are expected to return to the local museum and prepare other object catalogs as part of Tobey's class, which is affiliated with the history department's Historic Resource Management program.

The desktop system supporting the cataloging efforts is situated in the school's Laboratory for Historical Research, which was created last October to help history students prepare their classroom projects.

Two Terminals Housed

In addition to the floppy disk-based Terak machine, the laboratory houses two terminals — a Diablo Systems, Inc. 1620 and a Datamedia Corp. Elite 1520, which link to a Prime Computer, Inc. Model 400 in the campus' information processing center.

Using the Primos 15.1 operating system, the 768K-byte Prime 400 runs assorted statistical analysis packages that help students assess audience reaction to museum exhibits, according to Pamela Smith, a staff research associate with the history department's laboratory.

Smith sees the object-cataloging system here as playing a fundamentally different role from most other systems of its kind.

(Continued on Page 44)

Pertec to Service Alpha System 7s

LOS ANGELES — Pertec Computer Corp.'s Service Division has signed a two-year contract to provide field maintenance services for Alpha Professional Systems, Inc.'s System 7 minicomputers.

Originally developed for the legal profession, the Alpha 7 incorporates hardware and software for handling legal calendar keeping, time and cost billing and management reports. The system has since been expanded to accommodate general ledger, accounts receivable, accounts payable, inventory, financial analysis, mailing lists and other business functions.

Pertec has nearly 100 customer service locations throughout the nation, a spokesman said from 12910 Culver Blvd., Los Angeles, Calif. 90066.

Systems Intended For Accountants

SAN FRANCISCO — Targeted for accountants who now use outside DP facilities to keep track of corporate happenings, Itel corp.'s turnkey business system consists of the firm's General Ledger/Payroll Client Write-Up software and a Data General Corp. CS/30 minicomputer.

The system is marketed by Itel's Professional Services Division and includes a 64K-byte processor, a Dasher CRT, 10M bytes of disk cartridge storage and a 180 char./sec Dasher TP/2 terminal printer.

In addition to the Client Write-Up package, payroll, accounts receivable and accounts payable packages are also available from Itel. A Time and Disbursements package is planned for release later this year, a spokesman said.

System installation support is provided by Itel service representatives, and hardware maintenance is covered by DG.

The CS/30-based system leases for about $450/mo, the spokesman stated from One Embarcadero Center, San Francisco, Calif. 94111.

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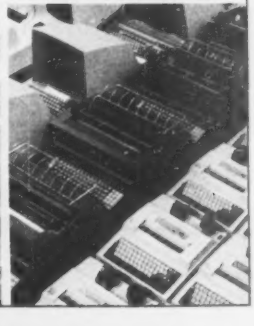
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Hilevel Offers Memory Development System

TUSTIN, Calif. — A read-only memory (ROM) and programmable read-only memory (Prom) development system and diagnostic tool that can be used to debug the logic burned into such memories has been announced by Hilevel Technology, Inc.

The DS100 can reportedly emulate the performance of the memories in bit-slice microprocessors and is said to execute the logic at the speed at which the finished product will operate or faster.

In addition, the DS100 can be used to diagnose products containing these ROMs and Proms after they have failed, according to a spokesman.

The DS100 has a maximum capacity of 64K address locations times a maximum word length of 480 bits, or more than 31M bits, the spokesman said.

In addition, the 41 nsec (worst case) access time ensures that logic developed for the target product will be exercised at rates high enough to uncover any timing-related problems before they are burned into the ROM/Prom components, the spokesman claimed.

Two Components

The DS100 consists of two components: the DS100-1 remote unit and the DS100-2, which contains the high-speed random-access memories (RAM). The design is said to enable the user to debug the microprogram at a work table while the logic is mounted in close proximity to the target machine.

Programs are entered into the DS100 through its keyboard or loaded across a standard RS-232 interface, the spokesman noted. Software for supporting development activities on most major mainframes is supplied by Hilevel Technology.

The DS100 offers a number of optional features designed to speed the application development cycle, the spokesman said. For example, a hexadecimal keyboard can be used to enter desired memory locations, data and program stop addresses.

Optional controls are said to enable the user to single-step, run continuously or run until a program stop address is reached. Other controls allow the user to disable the local unit's memory and to load the program under development from an optional cassette, the spokesman added.

A minimum configuration DS100 development system contains either 1K of 16-bit words (30 nsec bits) or 4K of 16-bit words (45 nsec bits) per memory module. Other memory configurations are set up by adding additional memory modules.

With cables and 1K of 16-bit memory, the DS100 costs $4,750.

Hilevel Technology is located at Park Irvine Business Center, Bldg. 10, 14661A Myford Road, Tustin, Calif. 92680.

DEC PDP-11 Gets Controller For Paper Tape

HOUSTON — A paper tape controller that is hardware and PC11 software-compatible with all models of Digital Equipment Corp. PDP-11 minicomputers has been announced by Computer Extension Systems, Inc.

The PTC 11 paper tape controller was designed specifically for the Data Specialties, Inc. S Series paper tape reader/punches.

The controller occupies on SPC slot in the computer, drawing 600mA at 5 Vdc. On-board DIP switches allow address and vector selection, and jumpers select a reading speed of either 150- or 300 char./sec.

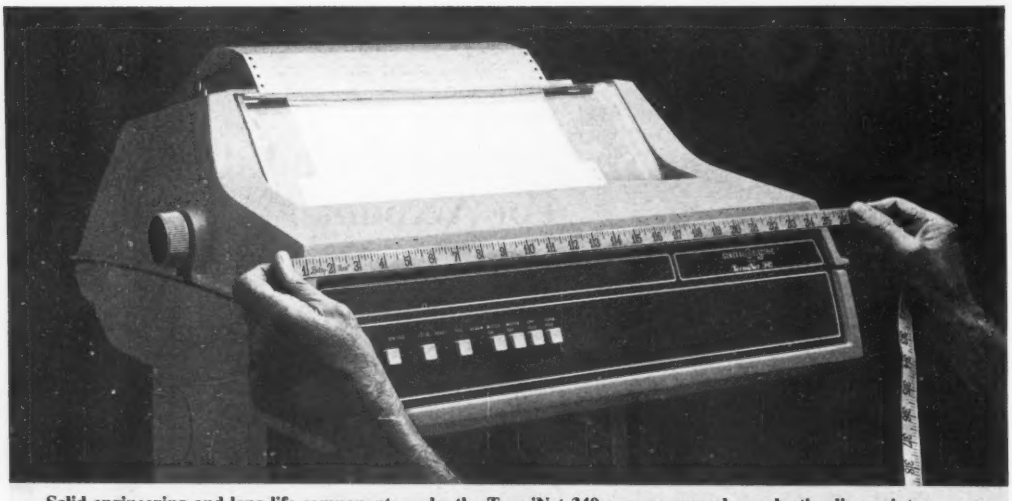
The unit costs $600 from Computer Extension at 17511 El Camino Real, Houston, Texas 77058.

Electronic Solutions Extends Warranty

SAN DIEGO, Calif. — Electronic Solutions, Inc., a manufacturer of multibus-related memory boards, has raised the warranty period on its product line to three years.

The company manufactures 4K to 64K random-access memory (RAM) boards, 16K and 32K programmable read-only memory (Prom) boards and multibus card cages and extenders.

The three-year warranty compares with usual warranties of 6 months to a year, the firm said from 7969 Engineer Road, San Diego, Calif. 92111.



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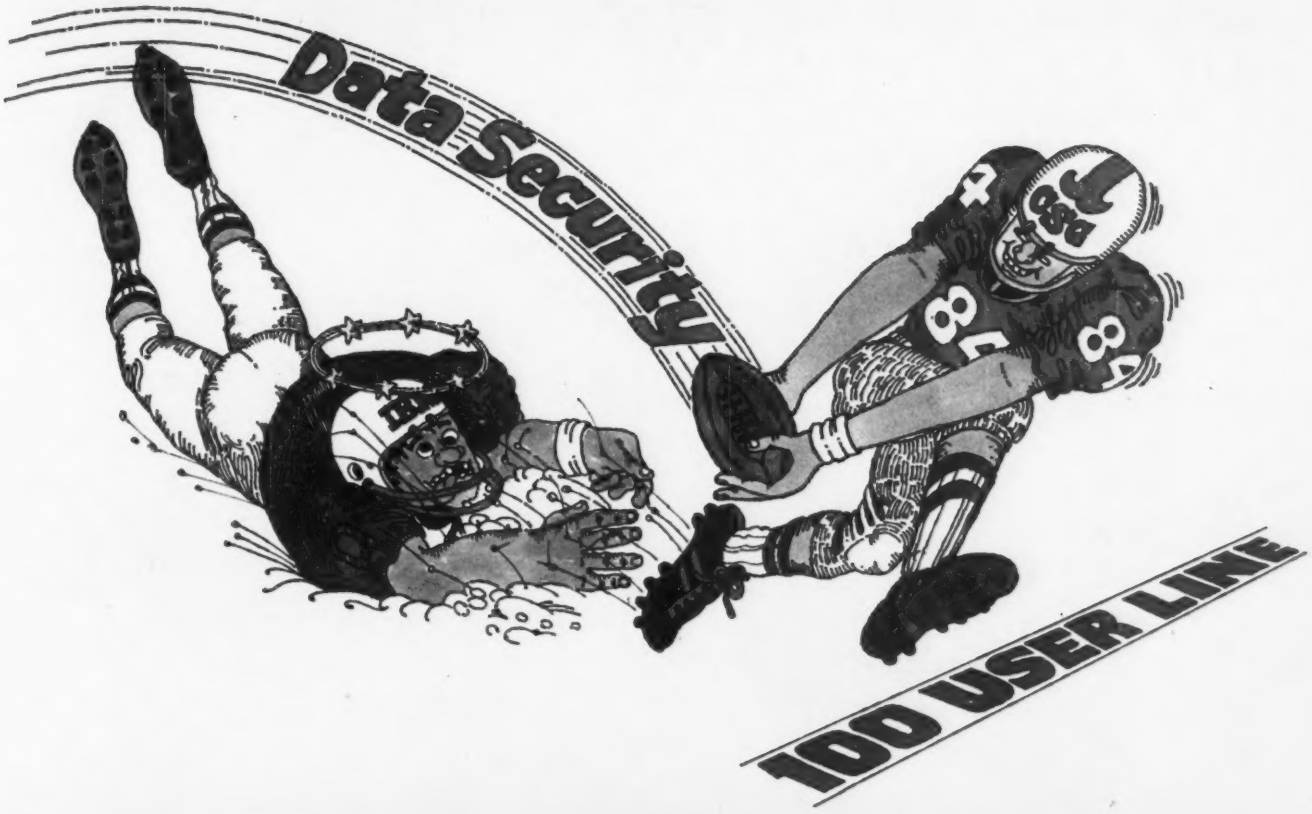
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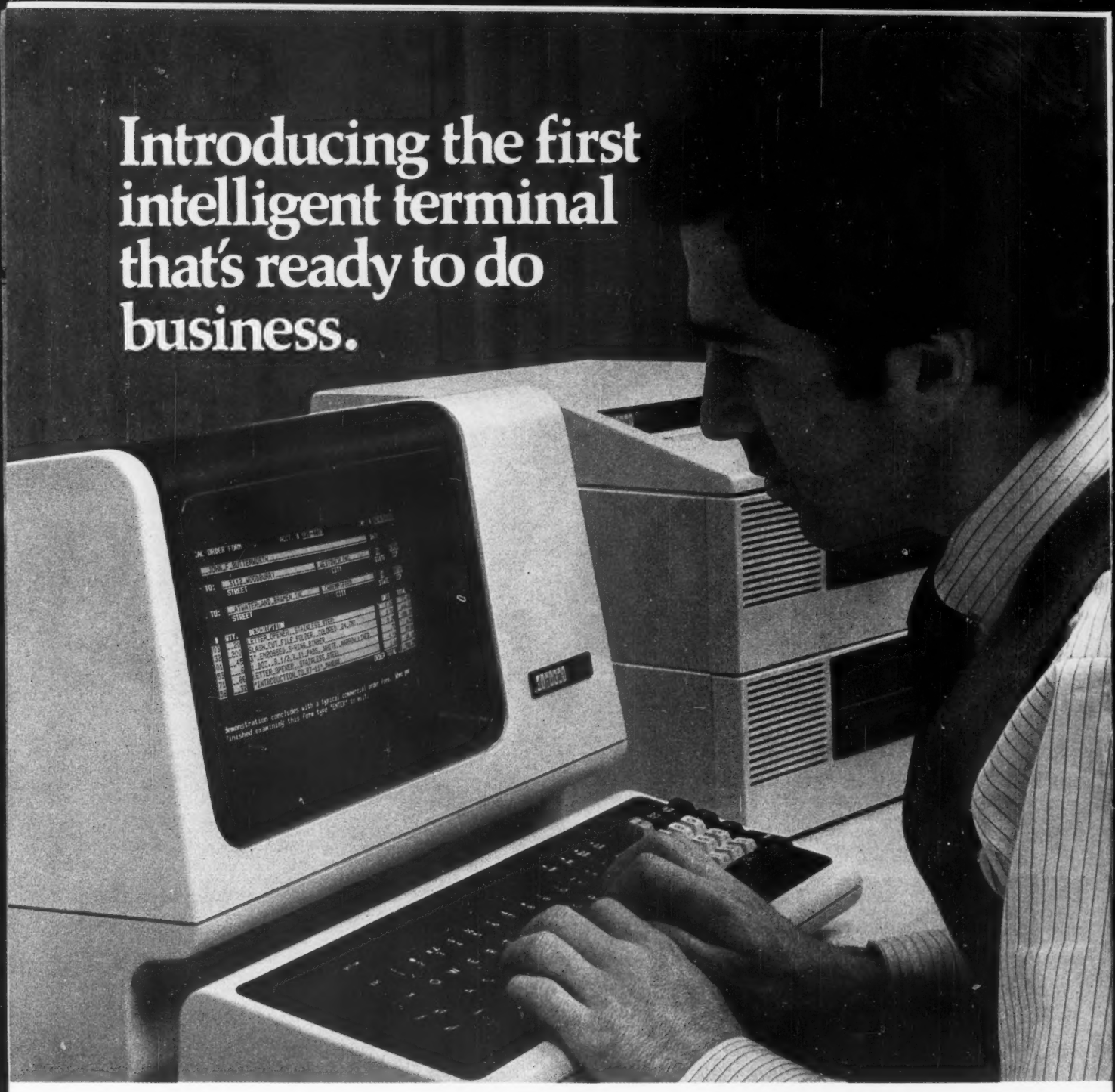
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digital

Mini Playing Role in Small Museum Operation

(Continued from Page 39)

At large museums, which account for most of the world's object-cataloging hardware, on-line inventory records are usually all inclusive. Any item considered part of a large museum's permanent collection is almost certainly listed somewhere in the institution's interactive data base, Smith explained.

For relatively small museums like the one here, however, a comprehensive on-line catalog of objects was deemed inappropriate. Instead, the history department deliberately chose a system that could maintain an interactive file of only a fraction of the museum's total collection.

Faculty members opted for such a system in the belief that a comparatively limited on-line storage capability would best suit the municipal museum's intended application. Unlike most large object-cataloging systems, which are used primarily as reference sources by visiting scholars and other nonmuseum personnel, the system here was planned almost exclusively for internal administrative use.

Routine Tasks Performed

The local museum's curator uses the system mainly to perform the routine tasks involved in preparing objects for public display. Beginning with a single class of objects — quilts, for example — the curator creates an interactive data file listing the condition, probable display site, environmental needs and other pertinent facts about each item in the class.

When he has collected all the necessary information about each object, the curator dumps his file from floppy disk to tape and proceeds to the next class of objects.

A runoff and text-editing program allows the system to produce printed copies of each on-line object-catalog file, Smith said.

Because he ordinarily works with only one class of objects at a time, the curator here neither needs nor wants an on-line listing of every item in his museum's collection. "A mass object catalog is usually monstrously expensive to maintain and is not the sort of thing that is likely to percolate its way down to the typical county historical society," Smith explained.

History department instructors here eventually hope to upgrade the Terak machine — which runs under the University of California (San Diego) Pascal operating system — to perform standard accounting functions, generate mailing lists and prepare texts for the local museum's newsletters.

Plotters Feature Paper Advance

PALO ALTO, Calif. — Hewlett-Packard Co. has enhanced three of its microprocessor-driven graphics plotters, providing automatic paper advance features for unattended plotting applications.

The models 7220S, 7221S and 9872S are upgraded versions of the RS-232C-interfaced 7220A and 7221B plotters and the HP-IB-oriented 9872B, respectively. In addition to performing regular plotting chores, the four-color enhanced units can accommodate repetitive or sequential graphics output from automated production and engineering test systems.

The units also accommodate unattended graphics at a central computer site and can produce multiple copies of graphs for reports and presentations, a spokesman stated.

The upgraded plotters advance the paper on command and cut and stack the plots, all under program control. Through the addition of four paper-advance commands to the previous plotter models, the machines advance paper in two different English and metric sizes, 11-by 17-in. and 8½ by 11-in. Conversion from English to metric sizes is accomplished by changing the forms and flipping a switch.

Like their plotting counterparts, the 7220S and 9872B use the firm's HP-GL programming language, which is made up of English-word abbreviations.

The cost of the paper advance plotting models is $6,750 for the 7220S and 7221S and $6,500 for the 9872S. Although HP doesn't offer the advancing function as an accessory, the firm will convert existing 9872A and 7221A models for $2,750.

HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Sometimes, Out-Thinking means sticking with what works

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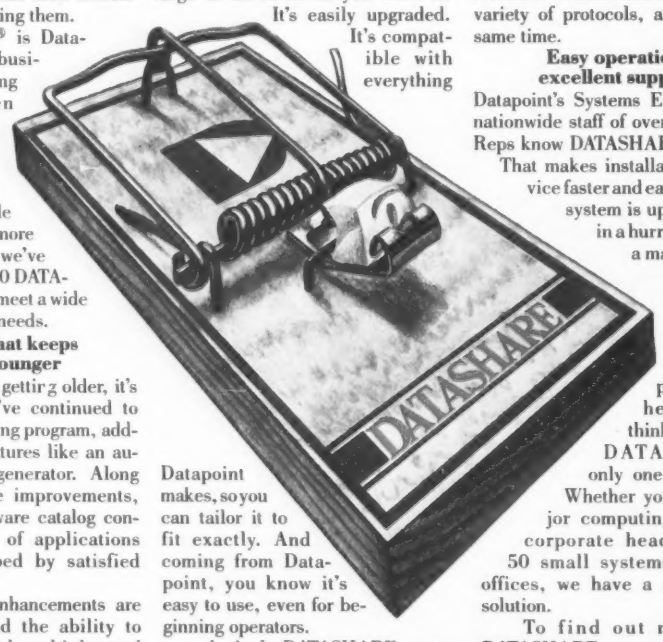
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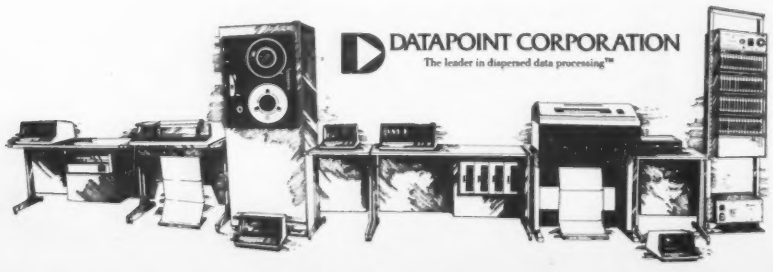
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Tests Products, Tracks Inventory

Mini Prescribed for Drug Company's DP Needs

SOMERVILLE, N.J. — While fast and accurate DP may be crucial to any business operation, it is highly critical to a drug manufacturing company located here.

Hoechst-Roussel Pharmaceuticals, Inc. relies on computer processing to test new drugs, as well as keep track of its vast inventory of medicines. Not only does the firm have to maintain detailed records for its own use, but it also has to have these records available for scrutiny by the Federal Drug Administration (FDA) which regulates and approves the firm's medicinal products, according to Dr. Krishan K. Arora, director of Hoechst-Roussel's medical systems.

Recently, the pharmaceutical producer installed a Hewlett-Packard Co. Model 3000 Series III minicomputer to front-end the IBM 3033 mainframe used for data analysis and reporting and for FDA submissions.

"The new computer gives the Medical Research Department a powerful, easy-to-use tool for entering, editing, correcting and reviewing the clinical data that will later be statistically analyzed by the mainframe," Arora said.

Outgrowing Capabilities

For about a year, before the HP minicomputer was acquired, Hoechst-Roussel leased a Datapoint Corp. 5500 machine. However, although the system worked well, the firm quickly outgrew its capabilities.

"It was not fast enough for us," Arora explained. "The number of different forms we use is rather large." In fact, "there are times we have 600 different forms, and the Datapoint . . . could not handle more than 200 at a time."

Arora pointed out that Hoechst-Roussel needed a local computer with more power and flexibility, one that could provide efficient data entry as well as on-line data base processing and inquiry. So, after nearly eight months of searching, the company's Medical Systems Department decided to go with the 3000 Series III.

The HP system has about 512K bytes of memory, includes a 120M-byte HP 7925 disk drive, a HP 7920 disk drive, a 1,600 bit/in. tape drive and a 600 line/min printer. Presently, 12 terminals access the system. Three are HP 2645 CRTs and four are HP 2640 stations.

The system also has a 120 char./sec hard-copy terminal and two low-speed and one high-speed modem. The computer uses HP's Image/Query data base management system (DBMS) and is linked to the IBM mainframe through a synchronous single-line controller and the high-speed modem.

At Hoeschst, every product goes through multiple clinical trials based on specific protocols, Arora noted. Each trial consists of a discrete set of "encounters" between the clinical investigator and the patient. At each of these encounters, certain information, such as admission data and efficiency data, is gathered.

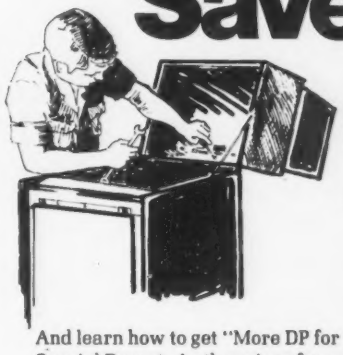
Once the protocol information has been entered and edited, it is transmitted to the mainframe for storage, statistical analysis and reporting, although some initial reporting is also done by the HP 3000.

Most clincal data is loaded into the Image data base with the help of a data

(Continued on Page 46)



Hoechst-Roussel workers key clinical and drug-related data into terminals linked to HP 3000 Series III.



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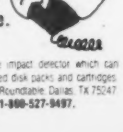
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Zilog Unveils Modular Development System

CUPERTINO, Calif. — Zilog, Inc. has introduced a series of modular and expandable product development systems (PDS) for Z8-, Z80- and Z8000-based microcomputer designs.

All four versions of the PDS 8000 — models 10, 15, 25 and 30 — have 64K bytes of memory, a printer interface, a 1,920 char. CRT and an RS-232C console interface. A standard feature of each system is a Z8000 software development package, which includes the ZDOSII file management routine, PLZ/ASM high-level structured assemblers, a Z80/Z8000 translator and a Z8000 L and MACP macroprocessor.

The RIO operating system, Z80 relocating macro assembler, text editor, linkers and utility software are also provided, a spokesman stated.

The use of PLZ/ASM is said to encourage modular programming by allowing large programming tasks to be broken into logically distinct but related parts that may be separately assembled and debugged.

The assemblers can also be used to create software for both the segmented and non-segmented versions of the Z8000 microprocessor, the spokesman added.

The PDS Model 15 comes in a free-standing enclosure and offers 600K bytes of floppy disk storage. A Z8000-based development module reportedly provides the tools necessary to create and debug Z8000 software, while communication between the module and the system allows assembled code to be loaded from disk, debuged, modified and returned to disk via system commands.

Extra Storage

For applications requiring more storage, the PDS 8000 Model 25 rack-mounted system offers 10M bytes of hard disk storage implemented by cartridge disk. The system can handle up to three drives for as much as 40M bytes of online storage, the spokesman noted.

The models 10 and 25 have the same specifications as the models 15 and 30, respectively, but the 10 and 25 do not include the Z8000 development module.

The PDS Model 10 is priced at $10,485; the Model 15 at $11,995; the Model 25 at $20,000; and the Model 30 at $21,500. All four systems are available 30 days after receipt of the order.

Additional information is available from Zilog at 10340 Bubb Road, Cupertino, Calif. 95014.

GA-16/460 Users Gain 1M-Byte RAM

ANAHEIM, Calif. — Users of General Automation, Inc. GA-16/460 minicomputers and GA-16/550 super minis can now purchase a 1M-byte random-access memory (RAM) board for their systems.

The Hypak memory is based on 128K-bit hybrid memory modules, with six-bit error correction on a 13- by 15-in. memory board, the company said.

The $15,000 unit featues an access time of 200 nsec and a 16K, commercially available memory dice to achieve packaging densities equivalent to 64K die technology.

All single-bit errors are detected and corrected, and dual-bit errors are detected so memory performance can be monitored continuously, the company said from 1055 S.E. Street, Anaheim, Calif. 92803.

Mini Helps Pharmaceutical Firm Test Products, Track Inventory

(Continued from Page 45)

dictionary/directory implemented in a set of variable-lenght Ksam files. This dictionary/directory, developed by the firm, defines all the data descriptions and edit specifications for the various protocols.

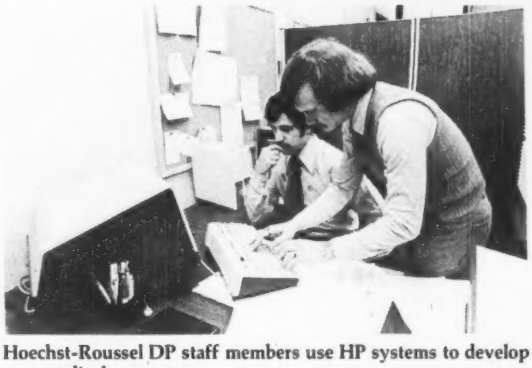
The data dictionary thus provides a central repository for information concerning the characteristics of a study. It is used by the data management subsystem for editing, inventory, listings and IBM data base definitions.

The Image data base is also used to store important chemical information, including a table listing pharmaceutical side effects. "The adverse reaction system in the data base tells us how many patients reported side effects," Arora said. "We could not get anything like that from the Datapoint."

Efficient Data Entry

Efficient data entry is obviously an important part of the Hoechst-Roussel DP operation. The system used by the firm is basically a key-to-disk emulator, with a major part of the system running on the HP 2645 CRT.

The data is keyed in 80-column card images using card masks extracted from the data dictionary. A microprogram running in the terminal allows autotabbing from field to field, automatic as well as manual duplication of fields and automatic insertion of record identification information. With buffering, the microprogram communicates with the HP 3000 in the background and accepts keying in the foreground.

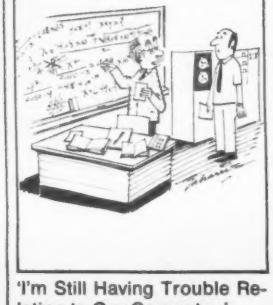


Hoechst-Roussel DP staff members use HP systems to develop new medical programs.

Hoechst-Roussel tests about a dozen drugs and medical formulas at any one time, the firm's medical systems director said.

"All the [drug] information is obtained from the field," Arora noted. "We're clinically testing these drugs on patients. All the data we collect — demographic, safety and laboratory — is kept on the computer while the study continues."

The system's data management subsystem supports interactive error-correction of data, batch editing and inventorying of master files, specialized listing utilities and movement of the master files between the minicomputer and the 3033.



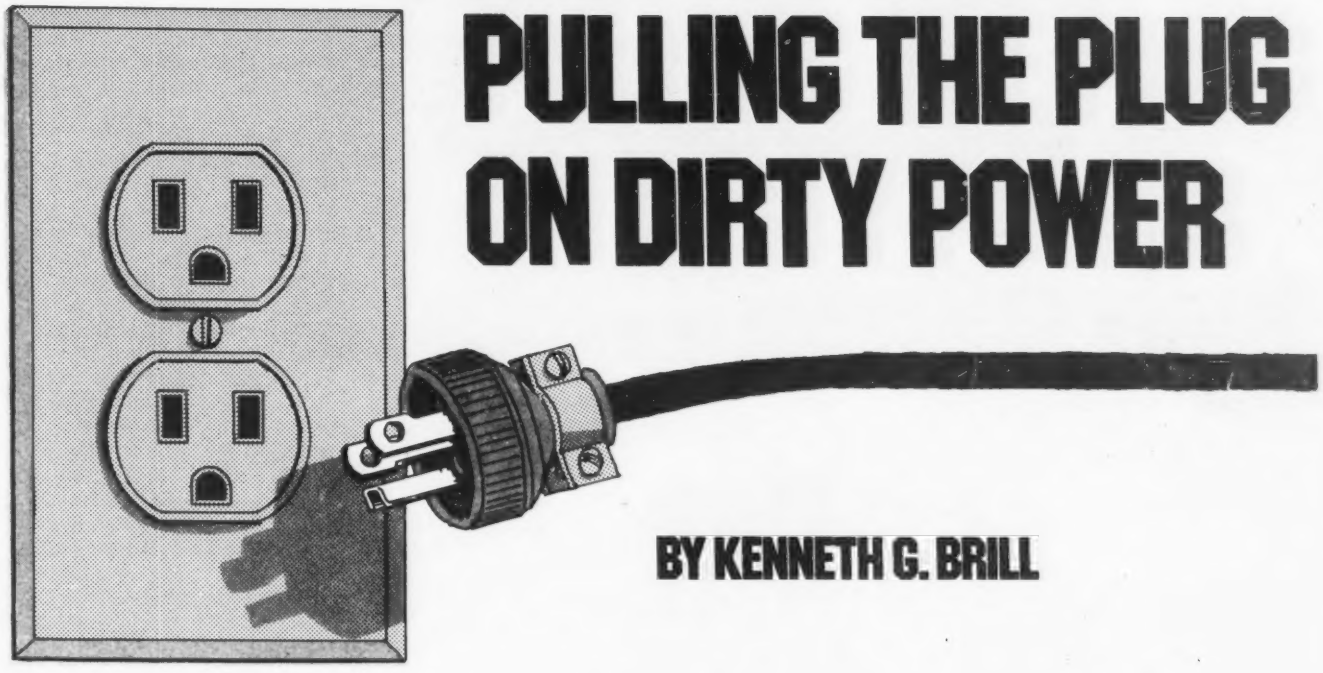
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PULLING THE PLUG ON DIRTY POWER

BY KENNETH G. BRILL

IN DEPTH

Outages. Brownouts. Surges and sags. Dirty power is becoming a fact of life for DP managers. Power protection equipment is available, and the selection is vast. So is the price range. Motorgenerators may be the wisest investment of all, says a supplier of computer power systems, who compares these synchronous motors with alternative equipment at both ends of the cost scale.

Random system crashes. Parity errors. Unexplained program jumps. Circuit board failures. These and other failures drastically reduce the productivity and throughput of computer facilities, and all are symptoms of one common DP problem — poor quality power.

Sensitive computer systems demand clean, computer-grade power, totally free from the momentary interruptions, transients, sags, surges and brownouts that occur with utility power lines. As the quality of utility power continues to deteriorate, power conditioning is quickly becoming a standard requirement for reliable DP operation — just as air conditioning is an assumed necessity now.

Many power-conditioning alternatives are available, ranging from single-purpose transformers to costly uninterruptible power systems (UPS). In between are other choices, but there is often considerable confusion about which alternative is most practical.

One of these choices, the motorgenerator, is probably the most cost-effective solution for computer power conditioning, although its operation and features are not fully understood and are sometimes confused with other types of rotary power equipment.

How Motorgenerators Work

Motorgenerators are clean, quiet, efficient, all-electric "power laundries" and should not be confused with diesel, natural gas or gasoline engine powered equipment. Typically, a motorgenerator, as its name implies, is an electric motor that drives an electric generator. A synchronous motor draws its power from the commercial utility and turns a totally separate and electrically isolated generator. This combination operates as a mini-utility dedicated to supplying the computer with clean, continuous power.

Despite utility transients of thousands of volts, severe voltage sags and surges and brownouts of 20% or more, the motorgenerator will supply the computer with a pure sine wave and a steady voltage within +1%. Moreover, the rotational momentum of the motorgenerator will bridge 40% or more of all power failures.

Common momentary outages (frequently observed as light flickering caused by lightning and other utility problems) are completely eliminated, allowing the computer to continue processing as if no threatening power problem had occurred. Outages longer than a motorgenerator can bridge are statistically rare, occurring zero to six times annually (depending on utility service and location).

Although a motorgenerator cannot bridge prolonged outages, it *can* minimize their destructive impact. Motorgenerators protect computer hardware from the "dirty off" and the resulting "surge on" that typically occur when utility power fails. By eliminating these severe power fluctuations, a motorgenerator protects hardware from blackout damage and allows an easy restart without the usual downtime experienced while waiting for the computer manufacturer's field service.

When properly designed and installed, a motorgenerator will totally isolate a computer from all power quality problems, and that means protection from more than 99% of all computer power-related failures.

Growing Market

The market for motorgenerator equipment has grown rapidly in recent years as computer manufacturers and end users realize that superior reliability, comprehensive power protection and cost effectiveness are more important than an array of flashing lights or the pizzazz of a UPS or the fancy sheet metal enclosures of other power technologies.

Rotating machinery is the hands-down choice of major computer manufacturers. The CPUs and memories of virtually all large computer systems marketed by IBM, Univac, Control Data Corp., Amdahl Corp. and Cray Research, Inc. are powered by 415 Hz motorgenerator systems. DP personnel are often not even aware of the presence of rotating equipment in the computer room because it has been well packaged in attractive, soundproof enclosures.

Many DP facilities provide power protection only for the CPU and memory, with a logical assumption that they are the most critical components — and also the most costly to repair. However, as power quality continues to deteriorate, it makes increasing economic sense to protect the entire computer system. While peripheral failure may not always result in a system crash or lost data, computer throughput can be reduced or stopped dead until repairs are made.

Motorgenerator vs. Transformer

When compared with a transformer, the motorgenerator can tolerate a much wider range of poor power inputs while maintaining a more precisely regulated output. And unlike a passive transformer, the motorgenerator can provide sufficient uninterrupted power to bridge momentary outages seen as light flickers caused by lightning and utility switching. Also, only the motorgenerator can protect the computer from a "dirty off" and the following "surge on" that typically occurs during a total power failure.

The motorgenerator provides a positive alarm to DP management when an out-of-tolerance input condition can't be bridged but a transformer device can only pass along the input it receives, with no alarms or warnings to management that the computer output may be suspect. And the only way to detect inadequate transformer protection is to purchase or rent a $4,000 power monitor.

With the present and projected rapid deterioration of commercial power, minimal computer protection would require the installation of both an isolation transformer and a voltage regulating transformer. For computers in the $400,000 price class and up, the cost of a two-transformer combination is more than half the cost of a motorgenerator. Yet, the motorgenerator offers at least 100% to 300% more power protection than any combina-

(Continued on Page 51)



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PULLING THE PLUG ON DIRTY POWER

Power Problem Type	Total Incidents Measured	Number of Incidents Corrected					
		Regulating Transformer		Isolation Transformer	Motor-generator	UPS	UPS with Diesel
		Ferro	SCR				
Undervoltages	1569	605	737	0	1559	1569	1569
Overvoltages	103	33	34	0	103	103	103
Outages	0	0	0	0	14	33	65
Transients-Common	1676	0	0	1676	1676	1676	1676
Transients-Normal	2831	0	0	0	2831	2831	2831
Total Incidents	6244	638	771	1676	6183	6212	6244
Power Protection Offered		10%	12%	27%	99%	99.8%	100.0%

Figure 1. Raw data on power problem incidence from 109 monitor month study done in 29 locations by Segall and Allen.

(Continued from Page 47)

tion of transformers.

The motorgenerator provides absolute assurance that undetected power problems cannot get through to the computer, thereby eliminating poor power as a potential excuse or alibi when the promised schedules are not attained or when the computer manufacturer's field service people have difficulty diagnosing a system malfunction.

When properly selected and installed, a high-quality *isolation transformer* can reduce common mode transients. It does a poor job, however, of protecting the computer from normal mode transients typically caused by heavy load changes and power factor correction. According to a landmark power study by George Allen and Donald Segall of IBM (Fig. 1), only 1,676 (or less than 37%) of the 4,507 total transients measured were of the type that an isolation transformer can eliminate. That, of course, means that at least 63% of all transients pass right through the transformer and on to the computer.

In contrast, a motorgenerator eliminates all types of power transients because the primary and secondary circuits of the system are mechanically, electrically and magnetically separated.

The correction time of most of the many types of *voltage-regulating transformers* is so slow as to be essentially ineffective in protecting for common sag/surge problems that last only milliseconds. To the uninitiated, one power cycle, or 16.7 msec, may not seem critical. However, most computer manufacturers specify that any voltage condition out of tolerance for longer than one-fourth of a cycle (4 msec) could result in hardware and software malfunctions!

Tap Changers

Although the silicon-controlled rectifier (SCR) tap changing transformer has the fastest correction time in the transformer family, even it is too slow to catch the 47% of all undervoltages that occurred in one cycle or less as measured by Allen and Segall.

Another drawback of the tap changer is its relatively narrow input range. Of all the under- and overvoltage conditions measured in the IBM study, only 46% would be corrected by an SCR tap changer. Voltage-regulating transformers based on other principles would offer even less voltage protection and are essentially good only for brownouts (long-term voltage reductions implemented by the utility to ration power).

The selection of appropriate voltage-regulating transformer technology is crucial to achieving even these limited levels of power protection. Devices using ferroresonant and magnetic amplifier principles are particularly difficult to specify because most published specifications are based on resistive, 100% loads. In reality, computers have a lagging power factor of .75 to .85 and the load can never approach 100% or the transformer output voltage will collapse to 0 volts, preventing successful startup because of the current surge when the computer is first turned on.

For this reason, ferroresonant transformers are usually oversized by 100% to 300% to permit the starting surge. As a result, these oversized devices operate very inefficiently and do not deliver the protection promised by their performance specifications.

The resultant cost of oversized ferroresonant equipment can exceed the cost of a smaller capacity but adequate motorgenerator!

The motorgenerator is the best voltage regulator available because the regulated output to the computer is independent of what is happening to the input. And, there is no delayed correction time as is necessary for all transformer devices. The motorgenerator's +1% output is maintained over the following broad range of inputs:

- 100% input voltage reduction for 200-500 (msec) depending on output frequency.
- 35% input voltage reduction for two minutes.
- 20% to 25% continuous input voltage reduction (worst case utility brownout).

Considering all the potential pitfalls of transformer devices (and maybe the worst is not knowing if they really are providing adequate protection), the motorgenerator can provide comprehensive quality power for only a small increment in cost.

Motorgenerator vs. PDS

Computer power distribution systems (PDS) are becoming increasingly popular but they do not take the place of either a motorgenerator or a UPS. PDS usually complements other protection equipment by distributing power via premanufactured cable from a central point to each piece of computer hardware. This eliminates the possibility for an electrician to make wiring errors, reduces life cycle electrical wiring costs and provides a single point ground.

If clean power is supplied to the distribution system, it in turn will supply clean power to the computer hardware. However, some PDS manufacturers also state or imply that their standard product will also clean up dirty power by eliminating transients and voltage problems.

Technologically, this is almost impossible as the utility-grade transformers incorporated into most distribution systems are several performance grades below the isolating and regulating transformers discussed in this article. As noted previously, even high-grade transformers provide relatively little power protection.

Motorgenerator vs. UPS

Motorgenerators and UPS systems perform the same function by protecting a computer from 99% of all power problems. The unique advantage of

(Continued on Page 52)

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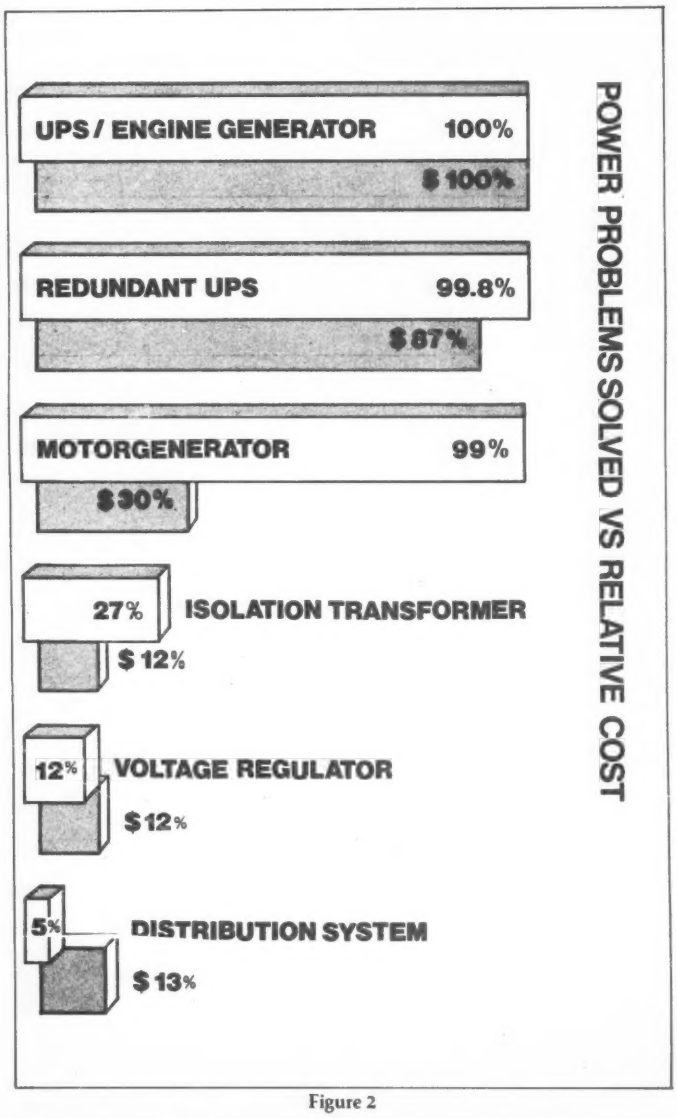
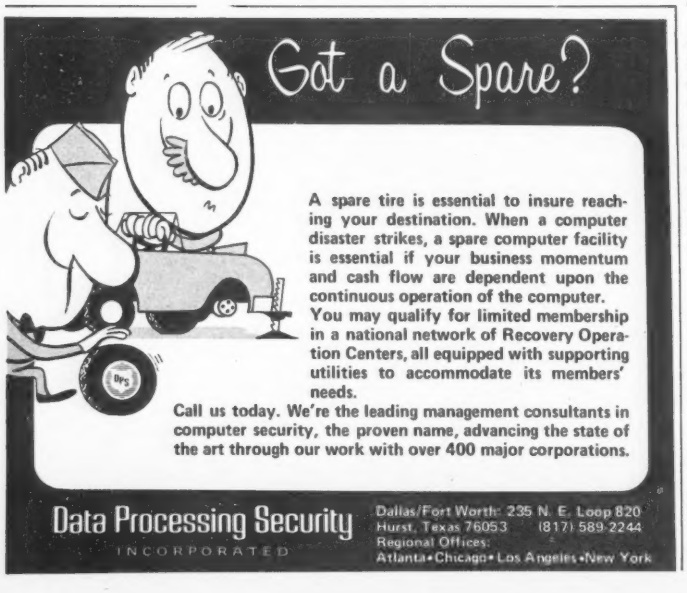


Figure 2



(Continued from Page 51)

UPS is that it can continue to power the computer for the few times annually that the utility might be off for a longer time than the motorgenerator can ride through. However, the cost of this last 1% increment of protection comes at a premium of three to four times the cost of a motorgenerator system.

Whether this advantage is worth its substantial cost depends on the critical nature of the application. Of course, some DP managers may want to boast of having the latest and most expensive equipment regardless of cost.

The actual cost of motorgenerator hardware runs about 50% to 60% of UPS hardware. However, the total *installed* cost of a motorgenerator runs only 25% to 35% of an installed UPS (See Fig. 2).

The motorgenerator is much simpler to install, uses less floor space, weighs less and does not require special environmental conditioning. If necessary, the motorgenerator can be located inside the computer room in a soundproof cabinet. However, the UPS, and especially the batteries, must be remotely located in a specially equipped environment that gives particular attention to battery vault design that will protect people from spilled battery acid and will ventilate potentially explosive gases.

A power consultant, whose fee will be $5,000 to $30,000, is almost a requirement to help select, design and install the appropriate UPS equipment. Failure to properly engineer a UPS installation can result in a lower level of computer reliability than if the system had not been installed at all.

Spare parts are another UPS consideration. UPS technology is changing so rapidly that most equipment designed only a few years ago is already obsolete. This means that facilities managers must stock a substantial inventory of spare parts to assure immediate repair service over the full useful life of the UPS equipment.

What most customers purchase and install is not an uninterruptible power system, but rather the components out of which such a system can be constructed — usually with great difficulty and expensive trial-and-error learning. Achieving an overall level of computer power system reliability that exceeds the utility input requires unusual skill, a holistic engineering approach, great attention to detail and knowledgeable maintenance.

The reliability figures published by most UPS manufacturers are somewhat misleading because they assume an automatic bypass to dirty utility power in the event a UPS component fails. While this might avoid an immediate computer "crash," the bypass also allows the computer to be "cooked" by dirty raw power.

Once clean power is restored, computer components previously stressed by poor power incidents typically take 10 to 12 weeks to fail.

In order for potential users to adequately judge the value of a power system, UPS vendors should supply reliability figures for both power continuity (presently given) *and* power quality (not given). If a DP operation requires higher quality reliability than normally provided, consideration should be given to redundant UPS systems, with, of course, even higher equipment, installation and maintenance costs.

Debate Over Reliability

The reliability, efficiency and maintenance costs of motor-generator vs.UPS installations are subjects of hot debate. UPS salesmen are fond of highlighting motorgenerator maintenance problems involving brushes and slip rings.

These arguments are just not true and indicate out-of-date information or deliberate dishonesty. Brushes and slip rings have been obsolete for 15 years and today's rotating equipment is entirely brushless, using maintenance-free, solid-state technology.

In fact, the only components subject to wear in a modern motorgenerator are the bearings, which have a minimum three- to five-year life although a 10-year bearing life is not uncommon. Simple hand-held testing devices are available which can predict when a bearing will fail and therefore permit replacement on a scheduled basis during a noncritical time.

In contrast to the relative simplicity of rotating equipment, which has been developed and refined over the last 100 years, the UPS uses thousands more components (all of which are subject to failure) in system designs that have been under development less than 10 years.

One of the most comprehensive independent studies on the cost of operating power protection equipment has been published for the U.S. Navy by Lt. Tom Key. The cost figures presented in Figure 3 were extracted from a paper given by Lt. Key before the IEEE Industrial and Commercial

(Continued on Page 54)

	100 KVA		300KVA	
	MG	UPS	MG	UPS
Inefficiency	$6,000	$5,300	$12,600	$11,600
Maintenance	1,000	8,000	1,000	10,000
Depreciation (Eight years)	5,000	18,750	9,375	30,000
Annual Operating Cost	$12,000	$32,050	$22,975	$51,600

Figure 3

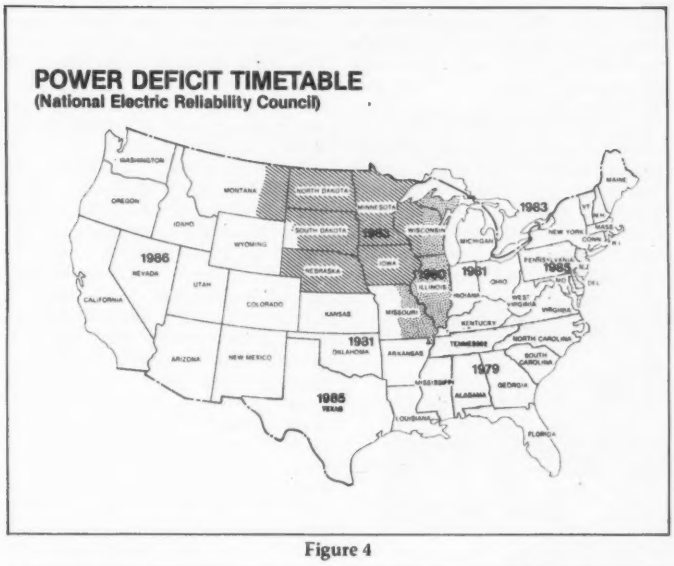


Figure 4

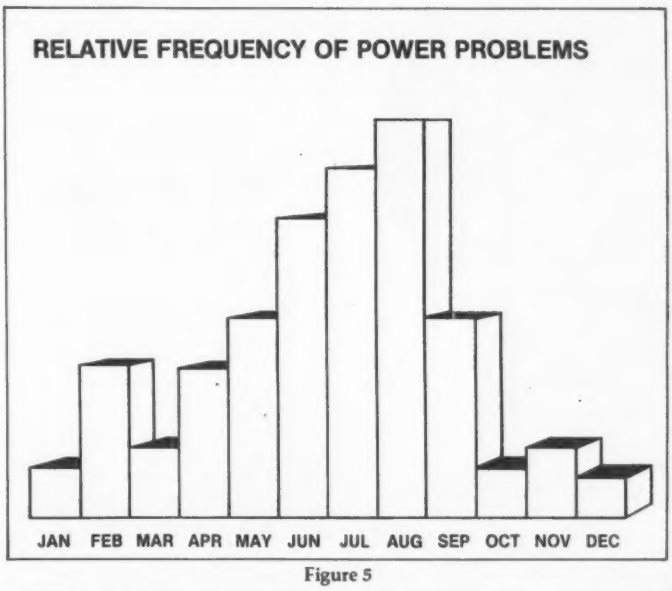


Figure 5

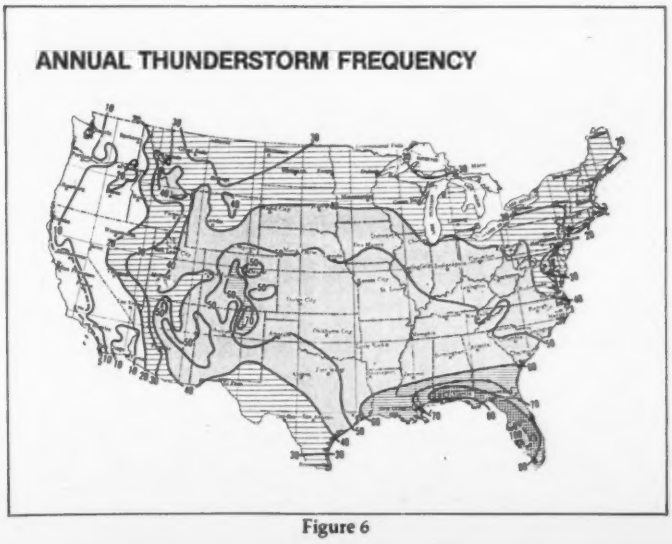


Figure 6

Five Poor Power Indicators

You can rate the potential for power problems at your installation using simple, easy-to-obtain information.

Primary factors include your geographical location, your utility's margin of reserve capacity relative to demand, the time of year, how power is delivered to your site and how well the computer is grounded.

Secondary factors include the growth rate of the area surrounding the computer site, the age of the electrical installation, the nearby presence of loads creating poor power and how power is distributed to the computer.

Using these predictors, we conclude that the Southeast region of the country, for example, has a high potential for power problems because of a shortage of utility capacity, frequent lightning and an acid soil condition which quickly destroys grounding systems.

Predictor #1: Utility's Margin of Reserve Capacity. Power problems are worse in areas where the utility is struggling to keep up with demand. Some regions of the country already have less than the desired reserve margin (individual utilities within the region may have better reserves than others); and other areas can expect power deficits as shown in Figure 4. The situation is bound to be exacerbated by delays in startup of nuclear power plants currently under construction.

Predictor #2: Time of the Year. Power problems come and go with the seasons. As shown in Figure 5, power problems are worse in the months of extreme temperatures when power demand on the utility is greatest. Problem frequency drops once the peak demand is passed, which may mislead some managements to conclude that no corrective action is required. Unfortunately, problems will return with the next cycle of seasons.

Predictor #3: Overhead Distribution. Overhead distribution systems are much more susceptible to problems caused by accidents, ice storms, animals, lightning and weather aging effects. In contrast, underground distribution systems are substantially more reliable. In one study, underground systems had 70% fewer undervoltage and outage conditions than overhead systems.

Predictor #4: Lightning. Lightning creates two types of power problems. One is a transient, which is self-dissipating if the strike is far enough away. The other is a momentary outage or undervoltage condition caused by "arc over," which can be transmitted through the entire power grid. Susceptibility to lightning problems is shown in Figure 6, where isobars represent the number of storm days per year. The area around Tampa, Fla., for example, is the lightning capital of the country with 100-plus storm days annually.

Predictor #5: Grounding. Single point grounds are essential for minimizing logic and other software problems caused by circulating ground currents. Unless carefully supervised, grounding can become haphazard, especially in sites that have cumulatively installed or removed a lot of equipment. Acidic soil conditions found in the mountain states and Southeast can quickly destroy earth ground rods.

Tying up the 80's

Heading into the '80's, two major questions face systems managers. First, how do you keep up-to-the-minute with ever-changing systems methodologies? Second, how do you combine the benefits of the various techniques? Ken Orr is in the forefront of developing such approaches, and because of this, he has a deep understanding of the approaches of the major systems scientists: Warnier, Jackson, Constantine, Ross, and DeMarco. Ken Orr can tie these ideas together for you in his most recent seminar, "Blueprinting the Future." This state-of-the-arts seminar is aimed at professionals who are already heavily involved in structured systems development, and is an outgrowth of his 1978 comparative design methodology course. The author of *Structured Systems Development*, Ken Orr is one of the leading developers of structured technology. He has designed *this* seminar to address the rapid convergence of the different structured trends, incorporating major advances based on his own work in the application of structuring to data base, teleprocessing, and distributed systems design.

Seminars will be held only in New York Oct. 22-26, in Chicago Nov. 5-9, and in San Francisco Dec. 10-14, with one-day management overviews preceding these dates. For early registration or information, contact Bob Otey, Langston/Kitch, 715 E. 8th, Topeka, KS 66607, (913) 233-2349.

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PULLING THE PLUG ON DIRTY POWER

IN DEPTH

(Continued from Page 52)

Power Systems Group and subsequently published in the September 1978 issue of *Electrical Construction and Maintenance.*

These figures clearly illustrate that while a UPS may be slightly more energy efficient, the motorgenerator is substantially cheaper to purchase and maintain, resulting in a decisive annual operating cost advantage in favor of the motorgenerator.

In summary, both the motorgenerator and the UPS have an important and specific role to play in providing computer power protection. The motorgenerator is the least expensive and the most comprehensive solution to all power quality problems representing 99% of all power-related problems. If the computer application justifies 100% protection and cost is not an issue, consideration must be given to a carefully engineered redundant UPS system with backup diesel generators.

However, if cost is an issue, a higher level than 99% protection can be achieved by integrating motorgenerator technology into an overall computer power system.

For Higher Reliability

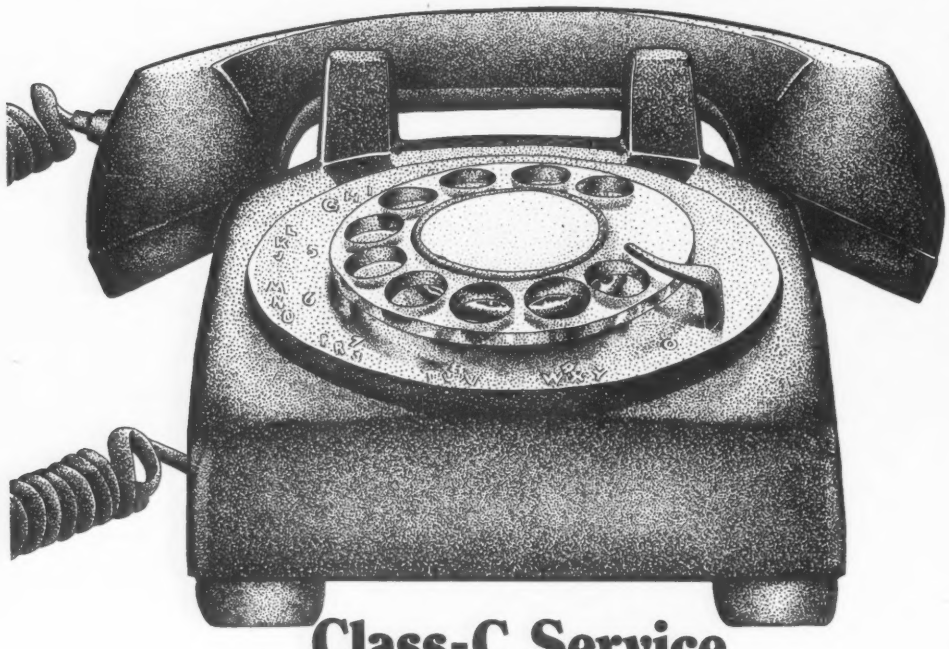
One way to provide close to 99.99% power reliability is to contract with the local utility to supply the computer site from two different substations. Both inputs are kept hot and are paralleled to supply power to a motorgenerator which in turn powers the computer load. Simultaneous malfunction of both feeders is virtually impossible unless the entire power grid fails. Failure of one feeder still permits the other one to carry the load while the motorgenerator filters out the resulting power fluctuations.

A redundant feeder/motorgenerator combination can provide protection as good as or better than UPS at a substantial saving. Many large buildings may already have multiple feeders or the economics may justify the installation of a special line.

When a motorgenerator is built as a prepackaged system, installation is usually quite simple. The motorgenerator should be located in a weather-protected area where the ambient temperature does not exceed 104° F. The floor should be reasonably level and adequate to support the unit weight.

Vibration isolation pads properly located under the unit frame can eliminate the need for permanent fastening

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to the floor. Electrical connections consist of three input wires and five output wires with hook-up often being completed by the plant electrician.

A maintenance bypass can also be supplied with the unit or installed in the field. Start-up service is sometimes recommended to familiarize users with the equipment and instruct maintenance personnel what to do in the event of a power system malfunction.

No Special Skills

Operation of a motorgenerator requires no special skills. Once the start button is activated, automatic internal controls regulate the machine and ensure satisfactory operation before allowing the computer to be energized.

In properly designed power equipment, safety circuits protect the computer in the event of a malfunction and provide various indicators to facilitate troubleshooting.

Maintenance usually consists of occasionally walking by the machine to check the control readouts. Bearings do require annual greasing (which takes 10 minutes) and once every three to 10 years the bearings will require replacement, which can be done on-site at a preselected time.

The data and conclusions presented here assume a carefully designed motorgenerator using fully integrated components and supported by the availability of a responsive field service organization.

Unfortunately, the motorgenerator industry serves many markets and some equipment currently offered will not meet computer users' requirements. However, a few motorgenerator manufacturers specialize in equipment built specifically for computer use.

Knowing that there is a difference should be fair warning for potential power system buyers to be very selective when choosing a manufacturer.

The most important factor is to determine whether the equipment manufacturer is offering an *integrated computer grade power system* supported by 24-hour field service or just a menu of components from which a power-knowledgeable buyer can, maybe, specify the proper system.

Literally hundreds of design details (like overdesigning the motor to handle brownouts, utilizing special frames to facilitate field-bearing changes, special malfunction indicator lights for remote telephone troubleshooting and complex ridethrough circuitry) must be taken into account when developing the most reliable motorgenerator system possible — one that will provide reliable, cost-effective and maintenance-free comprehensive quality power.



Kenneth G. Brill is a power consultant and president of Atlas Energy Systems in South El Monte, Calif., a supplier of computer power systems based on motorgenerator technology.

Brill has written extensively on computer power protection and has presented his strategies before numerous computer user groups.

He holds a degree in electrical engineering from the University of Redlands and an M.B.A. from Harvard.

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- How Word Processing Can Break the Office Paperwork Bottleneck
- Personal Computers for Business/Professional Applications

Thurs., Oct. 11

- How to Increase Software Productivity with Programming Aids
- DDP for Regional Office Networks
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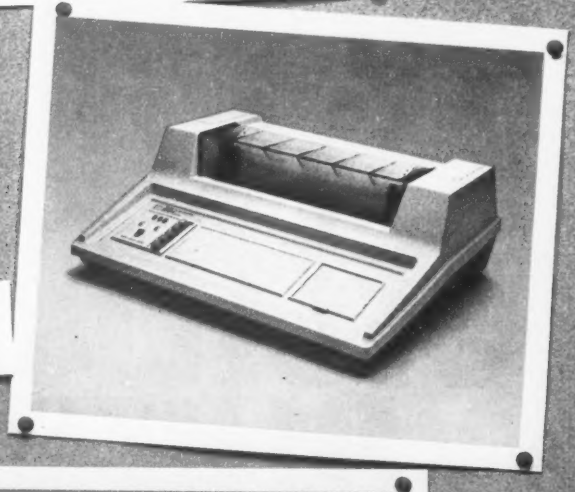
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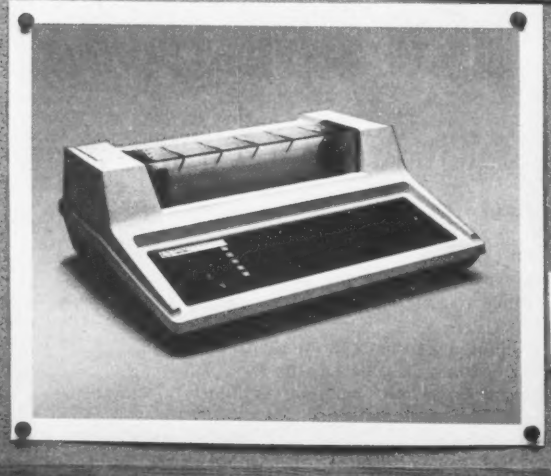
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Stan Trawick (right) is computer systems manager of Bassett-Walker Knitting Co., Inc., Martinsville, Va. Joe Kepley is an NCR district manager.

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Needs Financial Backing

Imsai Manufacturing Halts Operations

By Ann Dooley
CW Staff

SAN LEANDRO, Calif. — Imsai Manufacturing Corp., one of the forerunners in the microcomputer industry, has suspended its operations and "will simply disappear" if new financial backing doesn't come along soon.

Imsai filed for a Chapter XI — financial status between bankruptcy and solvency — March 12, and rumors in the industry seemed to indicate the company would emerge from its difficulties soon. However, on Aug. 6, the company suspended all its operations except for its finance and basic communications functions.

"It's been struggle, struggle, struggle" for quite some time, William Millard, Imsai's president, stated. The company sustained a large loss in the fiscal year ending Sept. 30, Millard indicated. That loss was so substantial that, although Imsai has been very profitable since then, it hasn't been profitable enough to get itself out from under.

Once a company starts Chapter XI proceedings, the fear begins to grow, and it's a Catch 22 situation, according to Millard. The "order rate goes to hell" and it's hard to catch up, Millard said, noting "Imsai lost the race."

Different Causes

Although several microcomputer companies are experiencing financial problems, Millard cautioned against grouping them together and regarding their troubles is stemming from the same causes. "The answers are more individual than group," he said. Imsai made some mistakes it couldn't afford to make. The company wasn't a product of its environment — its growth simply outstripped the system, and when it reached a certain point, it "blew apart," he said.

Millard went on to outline the problems his firm had undergone throughout the fiscal year 1978 and named the inability to handle its cash flow as the source of its financial problems.

Imsai went through several complete alterations in its business, Millard noted. Previously, 80% of its business was in chips, while at the end of 1978, 80% was focused on assembled computers.

Additionally, product offerings went from the simple 8080 to the complex VDP80 system, a complete integrated system, Millard recalled. The product line expanded dramatically to accommodate three newly introduced lines, and Imsai changed from a chip supplier to a full manufacturing firm.

In the process, Imsai lost control of its accounting functions. "The company wasn't able to tell anything about its profit and loss. As it happened, we weren't profitable and we didn't know it," he said.

Although Imsai's sales grew from $5.5 million to $7.5 million, the new product lines cost the company an enormous amount of money, and serious bugs in some of the machinery required a great deal of warranty work, according to the Imsai president.

Predicting Future

Predicting the future for the firm, Millard noted that several groups are organizing capitol to pump into the company. Even under Chapter XI, two major product lines were introduced. "I can't believe Imsai will go away. I can't imagine that someone won't exploit the current product line by stepping forward," Millard said.

Although Millard would not predict what would happen in the immediate future, he assumed the firm would go into receivership, and any financial proposals would be made to the court.

Millard, who estimated that there are as many as 15,000 Imsai machines in the field, indicated he didn't know what was going to happen to them. "Right now, Imsai is not able to support anything," he commented.

If — and Millard stressed the "if" — Imsai disappears, the retail stores will switch to other machines, and a market for boards for Imsai-compatible machines may open up. But everyone will have to handle the maintenance themselves.

Millard noted that many other companies may face a similar squeeze in cash flow and advised those companies to have sufficient funds to accommodate that squeeze. Imsai faced the squeeze "without sufficient margin for error, and that was our problem," he said.

Survey Finds
Retailers Seek Independence

By Ann Dooley
CW Staff

While the microcomputer industry experiences "growing pains" and companies such as Imsai Manufacturing Corp. and Processor Technology Corp. close down, retailers are being forced to reassess their position in the industry.

That dealers had to become less dependent on individual manufacturers and subsist on their own was the consensus from several retail store dealers around the country.

"A lot of retailers got the shaft," Charlie Babb of the MicroSun Computer Center in Walnut Creek, Calif., said, commenting on the fate of many retail stores after Processor Technology closed. According to several of the retailers surveyed, the manufacturer of the Sol microcomputer hadn't gone through the usual Chapter XI procedures and had closed without notifying any dealers or users, creating some hard feelings.

The closing down of a manufacturer creates financial problems for almost all the retailers who carry the manufacturer's products, Babb said. Since Processor Technology's closing, MicroSun has begun putting its own system together, in effect making the store an OEM dealer, Babb explained.

Dealers supporting Processor Technology equipment will begin hurting, because eventually they will run out of parts. Right after Processor Technology closed, there was a big run on parts and equipment, but that's only a short-term solution, Babb noted.

'Underhanded' Action?

"We were out [at Processor Technology] three weeks before they closed, and absolutely nothing was said," Joel Shusterman, from the Computer Emporium of Cherry Hill, N.J., noted.

Shusterman, who plans to take legal action against the firm, considers its action "underhanded." "We had kept buying equipment during those days and they sold it with warranties when they knew they weren't going to honor them," he stated, adding the action was a "real blow."

The Computer Emporium plans to maintain all the spare parts it can because it feels an obligation to its customers, Shusterman said. Most of the companies that are financially troubled are the ones that started servicing the hobbyist early on. These companies can't keep up with the business market that deals with the better known Digital Equipment Corp. and Apple Computer, Inc. systems, he said. The hobbyist market has leveled off as was expected, he noted.

Currently, the retailers are more in control of the marketplace than the manufacturers.

Dealers are now beginning to demand more professionalism from manufacturers. Many of the companies were started and staffed by young technical people with no sense of business or marketing. As the market has begun to broaden, this lack has become apparent, and these closings are the result, Shusterman noted.

The larger retailers have been servicing user's equipment for some time because it takes less time to do so. But many of the smaller dealers who relied on such firms as Processor Technology were forced out of business along with the firm, he claimed.

Larry Stein, president of Computermart of New Jersey, a dealership which carries Imsai equipment, stated that its closing would affect sales but that there are so many manufacturers with similar equipment that "losing one won't hurt."

Programs Monitor Satellites

COLORADO SPRINGS, Colo. — A microcomputer application called Satellite Tracking allows users to operate their own space center and satellite tracking site, not in a game format but as a practical real-life application, according to the vendor, Sat Trak International.

The initial series of three programs is designed for microcomputers with at least 16K bytes of random-access memory (RAM). The user is given information on obtaining and using satellite orbital parameters, which are available from the National Aeronautics and Space Administration (Nasa) at no cost. This data is used in each of the programs to calculate past, present and future satellite locations.

"Program POSN" (STI-11-E) generates a satellite ephemeris or parameters such as latitude, longitude, altitude, right ascension and declination of the satellite. "Program Look" (STI-21-L), the most comprehensive of the three, provides the means of finding a satellite visually from any location.

"Program OBS (STI-30-A) uses a time observation with the aid of the "Look" program to update the original parameters. Without this update, the original parameters gradually become less accurate.

The programs also include a 10-year almanac covering 1977 to 1986, recognition of leap years, the ability to access up to 10 satellites from the data base on each run and a second-order earth-flattening factor.

All programs are in Basic, although Fortran is available on request. STI-11-E costs $12.95 on cassette and $16.95 on disk, STI-21-L costs $15.95 on cassette and $19.95 on disk and STI-30-A costs $12.95 on cassette and $16.95 on disk. All three programs on one medium cost $29.95 on cassette and $39.95 on disk.

Sat Trak International can be reached through Computerland of Colorado Springs, 4543 Templeton Gap Road, Colorado Springs, Colo. 80909.

Includes Z80-Based Processor

Vanguard Offers Desktop Micro Featuring APL

SAN ANTONIO, Texas — Vanguard Systems Corp.'s APL/DTC desktop microcomputer features the APL language.

A complete hardware/-software configuration, the APL/DTC includes a 4MHz Z80-based central processor, two quad-density minidisk drives, a video terminal, an APL character generator, object code disk and documentation. The APL/DTC costs $6,495 plus tax and freight, a spokesman said.

The system gives users 24K bytes of usable active APL workspace. The APL language includes standard APL arithmetic functions plus boolean, relational, selectional, structural and general functions such as execute and format.

The APL/DTC also contains system variables and system functions and offers disk-based workspace and copy-object libraries. In addition, the system supports arrays of up to eight dimensions.

The standard APL/DTC system includes one auxiliary processor for interfacing I/O ports and another to implement an indexed file system. Three additional auxiliary processors are available as options and include one each for data communications, high-resolution graphics manipulation and analog-to-digital conversion.

Additional Languages

Because the APL/DTC uses a standard Digital Research Corp. CP/M operating system, users may run many languages in addition to APL. Optional software packages include Basic, Fortran, Cobol and Pascal languages.

The standard APL/DTC offers a range of options that can tailor it to specific APL needs, the spokesman said. Active workspace can be expanded to a total of 36K bytes.

A communications interface with built-in modem can be added to let the APL/DTC communicate directly with other computers via phone lines. The high-resolution graphics option gives a 256 by 240 raster scan graphics display.

In addition, an analog-to-digital conversion interface lets the APL/DTC monitor physical events and output control commands.

Two extra mini-floppy disk drives can be added for 630K bytes of additional file space. For hard copy, a 120 char./sec APL/Ascii matrix printer and workspaces including Simulation of APL Plus file system, keyed Indexed Sequential Access Method (Isam), Inventory Control and Financial Analysis are also offered as options, the spokesman said from 6812 San Pedro, San Antonio, Texas 78216.

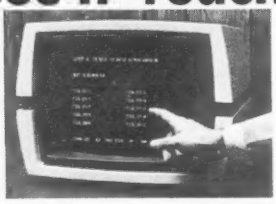
daisy-wheel correspondence-quality printer are offered. Word processing is also available.

The packaged applications



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Console Bootstrap Loader Bows For DEC LSI-11, Plessey Micros

IRVINE, Calif. — Plessey Peripheral Systems, Inc. has introduced the PM-REV11/2 console bootstrap read-only memory (ROM) loader for operation with the Digital Equipment Corp. LSI-11 and Plessey Micro I and II.

The PM-REV11/2 is an enhanced replacement of DEC's REV11, according to Plessey. The entire bootstrap capability is contained in 256 words of programmable read-only memory (Prom), which leaves space on the board for 256 more words of user program space or custom bootstraps, the firm said.

The unit supports devices zero to seven of the DEC RK11, TM11, DT11, RP11 and RF11 and devices zero and one of the RX11. By specifying a nonstandard Control Status Register as part of the input mnemonics, a nonstandard device can be booted.

The device is available in four configurations that contain various combinations of a switch register and bus terminator. Also included in all configurations are a bootstrap ROM and Direct Memory Access (DMA) refresh.

The PM-REV11/2A, which includes all of the above functions, costs $255 from the firm at 17466 Daimler, Irvine, Calif. 92714.

Guide Covers Mass Storage For TRS-80

ALBANY, Calif. — A free booklet outlining methods Radio Shack TRS-80 users can use to load and store off-line programs is available from Parasitic Engineering, Inc.

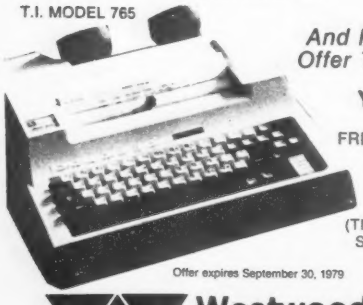
"Mass Storage for the TRS-80" describes cassettes, mini-floppy disks, full-sized floppy disks, data cartridges, high-speed cassettes and the proposed hard disk systems, according to Parasitic.

The booklet deals with such topics as compatibility, software availability, cost, reliability and versatility. The advantages and disadvantages of each system are also discussed, Parasitic said from P.O. Box 3614, Albany, Calif.

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Also Helped by 'H' Series Rumor

Memory Makers Heal After 4300 'Blow'

By Marcy Rosenberg
CW Staff

Independent add-on memory suppliers, hurt by IBM's 4300 announcement, claim to be healing fast as prolonged deliveries for the new processory series spur many users to clamor for interim upgrades on existing systems.

Also promising to lift the independents out of their doldrums is speculation about the industry giant's rumored "H" high-end replacement series that is forcing IBM 370/158 and 168 users to try to prolong the lives of their systems.

Independent suppliers are confident users will turn to them rather than to IBM to meet their requirements for increased capacity, primarily because of the price and delivery advantages offered by the independent market.

Indeed, some independent suppliers say business is already picking up and a few, such as Cambridge Memories, Inc., see prices firming.

National Semiconductor Corp. — traditionally an OEM add-on memory supplier that began marketing IBM 370/158, 168 and 30 series memory to end users a year ago — experienced an upsurge two to three months ago.

Orders and shipments increased between 50% and 60% over the last six months, according to Jim Siehl, director of marketing for the firm's Computer Products Group, who added, "we are shipping add-on as well as memory for our own processors at a rate of more than 100M bytes per month."

He admitted National Semi's add-on memory business took a dip in the first quarter because following the 4300 announcements and subsequent "H" series rumors, "everyone began to contemplate their navels. But we're over that now."

Electronic Memories & Magnetics Corp. (EM&M) points to increased add-on activity in the 370/138, 145, 148, 155 and 158 areas. Anthony Coppola, Computer Products Division director of marketing, noted a 40% rise in order bookings for the second quarter over that in the first quarter ended March 1979. "We are targeting 400M to 500M bytes in shipments for the year," he said.

Boom Will Continue

Though in agreement that this upturn stems largely from users seeking increased capacity as a stopgap unitl 4300s are shipped and the "H" series debuts, most independents would argue with those who say the boom will be short-lived.

"We'll still see continued demand once the 4300s are delivered," Coppola maintained. "The machines displaced by the 4300 will then go through a remarketing cycle, and it is not unusual for follow-on buyers to add on more memory."

Some suppliers, however, do admit that

(Continued on Page 64)

Nixdorf Building U.S. Image Since Acquisition of Entrex

By Ivan Berenyi
Special to CW

Overcoming American doubts about the seriousness of its U.S. presence has been Nixdorf Computer Corp.'s major preoccupation since it acquired Entrex, Inc. in May 1977.

"The basic question is whether a 'foreign' supplier can give its U.S. customers blue-chip service on a long-term basis," Executive Vice-President Klaus Luft said. "It's much easier for a European customer to accept Nixdorf as a long-term partner than for an American company, especially since many smaller U.S. firms aren't even familiar with the Nixdorf name. It was always easier with the larger companies; they knew we were shareholders in Amdahl.

"But when the Americans find out about our finances and our size, then it's a different story. It's really a lot easier to get an open door in the U.S. than it is in Europe. Users are that much more open-minded. You can talk to anyone, and from then on it's up to you."

In 1978, Nixdorf's U.S. revenues were $81 million, up 55% over the previous year's results, representing some 15% of the Nixdorf group's worldwide business.

The Entrex acquisition has transformed Nixdorf from a German firm with a number of North American and other overseas branches into a multinational corporation which just happens to have its headquarters in Paderborn, W. Germany, rather than in Poughkeepsie, N.Y. or Palo Alto, Calif.

German and American teams work jointly on new products. There is a constant two-way traffic between Paderborn and Burlington, Mass. German technicians spend time in the U.S. studying the market, while American managers spend time in Germany submerging themselves in company philosophy.

"We think it's important to be in the American market, quite apart from financial results, in order to see the shape of future competition from the very beginning," Heinz Nixdorf, the group's founder and chairman, said. "The U.S. market is very creative and, of course, the U.S. is also the main source of semiconductor-based technology."

Nixdorf believes his company's decision to buy into the U.S. market was a historic reversal of roles. "The Europeans are buying themselves back into the world market to some extent," he maintains. "When the dollar was strong, the Americans were buying everything in Europe; now the dollar is weak and the Europeans are buying a portion back. It's a natural reaction."

Assimilating an American staff of almost 1,500 — one-sixth of the group's entire workforce — was far from easy. "Our style is more efficiency-oriented than our U.S. managers were used to," Nixdorf said. "We stress quality, after-sales service and a clear-cut, simple approach to fast decision-making."

But that assimilation has taken place, Nixdorf asserts.

With more than 6,500 units installed, less than half of which date from Entrex's pre-takover days, Nixdorf Computer Corp. is now ready to think in terms of expansion. "We see a potential growth rate of 50% to 60% a year in distributed processing and we are just getting into word processing in earnest," Klaus Luft said. "The problem is how to take advantage of existing opportunities and still have time [to develop] new products; we must be economical within our resources."

Still, Nixdorf is firmly committed to expanding its product range into telecommunications. This commitment was evidenced by Nixdorf's decision late last year to relinquish control of a quarter of the company's shares to the Deutsche Bank in return for a cash injection of $107 million.

However, the firm's chairman firmly denied industry speculation that the demands of the Entrex assimilation and expansion elsewhere left the comapny short of liquidity. "We could have gone to the Stock Ex-

(Continued on Page 64)

Gene Amdahl Planning to Retire

SUNNYVALE, Calif. — Taking the computer industry by surprise, Dr. Gene Amdahl, chairman of Amdahl Corp., recently announced he would retire from the company sometime after January 1981.

Smoothing the way for the transition, Amdahl will step down as chairman of the board Sept. 1, becoming chairman emeritus. Eugene R. White, currently deputy chairman, will succeed as chairman.

Despite plans for retirement, Amdahl said he will continue to be active in technical matters within the company and will chair the recently formed Technical Excellence Committee.

Reached at his home last week, Amdahl



Dr. Gene Amdahl

bristled at the suggestion that his retirement plans were prompted by the possible merger between his company and Memorex. Amdahl said that during the next few years he wants to become less involved with day-to-day company activities and would like instead to concentrate on strategy and technical leadership.

"During the past, I have not been able to devote adequate attention to my personal financial matters and other outside interests. I feel the progress we have made in building our company will now allow me to make such a move," Amdahl said.

He also denied speculation that he would be devoting any attention to Magnuson Systems Corp., a recently formed IBM plug-compatible maker of which his son is a principal.

"They are already doing a whale of a job without me," he retorted.

Industry watchers are mulling over the possible result of Amdahl's move on the company, which for its second quarter experienced a 24% decrease in revenues from the comparable quarter a year ago. For the year to date, Amdahl's earnings are down about 30% from a year ago.

Amdahl's poor financial performance has been attributed to the impact of the IBM 4300 announcement and the anticipated introduction of the H series next year.

DEC Reporting Revenues of $1.8 Billion for '79

MAYNARD, Mass. – Digital Equipment Corp. reported revenues of $1.8 billion for fiscal 1979, up 26% from revenues of $1.4 billion last year.

Net income for the year ended June 30 was $178.4 million, or $4.10 per share, a 25% increase from last year's earnings of $142.1 million, or $3.40 per share.

For its fourth quarter, DEC's revenues were $524.2 million compared with 1978's fourth quarter revenues of $412.5 million. Earnings for the final quarter were $61.7 million, or $1.40 per share, a 33% increase from earnings of $46.3 million, or $1.08 per share, a year ago.

Remains Cautious

Despite substantial increases in both revenues and earnings, DEC remains cautious about the outlook for business. However, one analyst said DEC's earnings are in line with projections.

The economy has held up longer than most vendors expected, Terry Carleton, an analyst with Bache Halsey Stuart Shields, Inc. explained. DEC tightened up its belt in anticipation of a recession. That belt tightening, along with a significant improvement in the firm's operating cycle – the time it takes to produce goods, ship them and get paid – has helped the firm's profit picture, Carleton noted.

In 1977, for example, that cycle was 248 days, but DEC honed the cycle down to 200 days this year – a 20% improvement, he noted.

At the end of the fiscal year, DEC had more the 44,000 employees worldwide and had installed more than 185,000 computers, the firm said.

Just prior to releasing its latest financial results, DEC also announced the names of its first 17 authorized DEC distributors. The distributorship program was introduced in January.

"We believe this first-in-the industry concept underscores DEC's committment to its OEM channel of distribution," according to Irwin Jacobs, vice-president of DEC's Commercial OEM Group.

Any commercial OEM can apply for an authorized distributorship, but all OEMs must then undergo certification.

In return, the distributor is allowed to use a specially created Authorized Digital Distributor logo. DEC will reimburse these distributors for 40% of approved advertising expenditures.

Philips Seeking Interest in PCC

LOS ANGELES – Pertec Computer Corp.'s (PCC) board of directors is considering a proposal made by North American Philips Corp. to acquire a significant minority equity interest in the company.

James R. Grimm, PCC senior vice-president and chief financial officer, said he was not at liberty to discuss the specifics of a possible agreement with North American Philips or to comment on what the advantage of such an alliance would be until the PCC board had time to review the proposal.

However, although he did not identify the firm making the offer at the firm's recent annual meeting, Ryal R. Poppa, chairman, president and chief executive officer, told shareholders PCC was actively considering such an offer as well as alternative arrangements with other firms.

Encouraging Signs

Poppa said he is encouraged by signs that indicate the firm is beginning to emerge from several quarters of flat earnings performance. However, he cautioned, "we are still seeing some lingering heavy start-up expenses in the peripherals area, attributable to bringing new products into full production."

These products initially carry lower profit margins as a result of large contract commitments, he claimed.

Moreover, Poppa noted PCC was experiencing a "mild softening" in order rates, which is related to an uncertain economic future. In addition, the inflationary effects of the prices of precious metals such as cobalt and gold and the slower collection of receivables resulting from higher interest rates to customers and to PCC may continue to affect profit levels.

On the up side, PCC has great expectations for its 8-in. fixed disk drive unit, the Mini Wini, and now has 90 authorized dealers for its PCC 2000 small business system.

For its first quarter, PCC earnings were $1,395 million, or 20 cents per share, a decrease from the $1.5 million, or 25 cents per share, earned during its first quarter a year ago.

Poppa said he expected these lower margins to continue through the second quarter and then resume more normal growth rates.

Revenues for the first quarter were $33.2 million, up 13% from revenues of $29.8 million in the comparable quarter a year ago.

Orders & Installations

Normalair Garrett, a British equipment manufacturer, has installed an NCR Corp. factory data collection system.

The Mid-America Life Assurance Co. has installed a Burroughs Corp. B1860 computer system.

Forty Dutch post offices have ordered Philips Data Systems Nederland PTS 6000 terminal systems.

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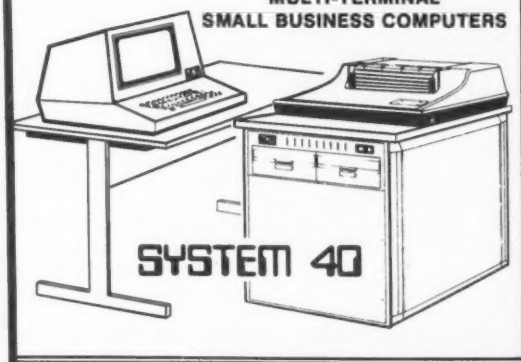
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Guide Covers Market Forecasts For Computers, Communications

WELLESLEY, Mass. — A reference book containing market facts and forecasts for the computer and communications industries is available from Venture Development Corp. (VDC), a consulting firm here.

Called "Venturecasts: The 1979 Computer/Communications Data Book," the book is a compilation of information from VDC's files and more than 100 business periodicals, government and industry association publications and market studies.

Data includes quantitative information on sales, shipments, revenues, installed base, growth rate, consumption, expenditures, market size, production, imports and exports for more than 150 industry topics.

Industry Sectors Covered

Among industry sectors covered are data entry equipment, disk drives, communications equipment, memories, peripherals, terminals, software, computers and computer systems.

The "computers" heading spans a range of equipment such as mainframes, small business systems, minicomputers, microcomputers, home and hobby personal computers and digital and analog, general-purpose and desktop devices.

Under "computer systems" are applications including financial and banking, government, insurance, automotive, medical, numerical control and process control.

Several sections are devoted to Viewdata and Teletext, bubble memory technology, the office of the future, electronic mail and fiber-optic communications.

Information is listed as "one liners" including the title, issue and publication date of the data source. Each entry is coded according to the federal government Standard Industrial Code (SIC) and augmented by VDC to provide extra detail, the firm said.

The book costs $1,950 from VDC at One Washington St., Wellesley, Mass. 02181.

Contracts

Data Access Systems, Inc. has been awarded a supply contract from the General Services Administration to supply terminals manufactured by Digital Equipment Corp., Texas Instruments, Inc., Lear Siegler, Inc., Teletype Corp. and Diablo to all branches of the federal government.

T-Bar Inc. has been awarded a contract in excess of $500,000 from United Airlines for computer switching equipment to be used at the airline's computer center in Denver.

The Saudi Arabian National Center for Science and Technology has awarded a contract to Informatics, Inc. for the establishment of a Saudi Arabian Scientific and Technological Data Base and Information System.

General Dynamics Co. has received a network analysis contract from its parent company to analyze General Dynamic's corporatewide telecommunications services and equipment and prepare recommendations for system integration and network unification.

Hamilton/Avnet Opens Japanese Operation

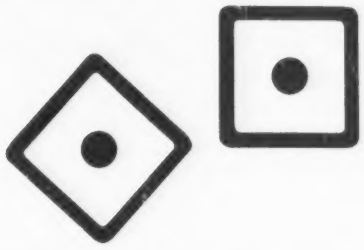
CULVER CITY, Calif. — Hamilton/Avnet Electronics has opened its first overseas stocking location in Japan.

"We intend to concentrate first on active semiconductor components," according to Ed Kaniger, vice-president of international operations and president of Hamilton/Avnet Electronics Japan, Ltd. "We will be looking to grow, to acquire new franchises and to penetrate the Far Eastern market further," he added.

Initial franchises include Intel Corp. and National Semiconductor Corp. products.

The Japanese operation expects revenues of $4 million during its first year and $20 million during its third year.

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Nixdorf Starts Making Presence Felt in U.S.

(Continued from Page 61)
change at any time during the year and we did not," he said.

"But on the other hand our wish is to broaden our business from computers to communications at large and it seemed opportune to enhance our capital base in preparation. The capital infusion, which conceded a measure of outside control for the first time in the company's history on only a temporary basis, is earmarked for future new activities — namely for expanding into communications and for enhancing our penetration into world markets, particularly in the U.S."

Nixdorf refutes suggestions of an attempt to align his company with U.S. firms in terms of capital structure as a prelude to any future U.S. move (European companies tend to be undercapitalized in comparison with their U.S. counterparts in the eyes of Wall Street. He said the company will not enter the communications market alone. Instead it will seek some form of cooperative partnership with a firm already established in the market.

This seems to imply a possible future purchase in the U.S., but Nixdorf would not elaborate. "Whether you buy or not, when you expand into a new field you need new capital," he said. "More work places and more staff mean more investment."

Nixdorf is still nursing a long-held ambition to move upward into the mainframe market, despite the sale of his stake in Amdahl, once seen as the vehicle for a joint development. "It was a pity — although a lucrative move," he said, referring to the sale, "but we only held 5% interest anyway."

"It's possible — and indeed likely — that we'll move into the mainframe area at some point in the future," he said. "But as we are now broadening our campaign into communications and word processing already, it will probably have to wait.

Though often regarded within German industry as something of a maverick, Nixdorf is a man of singular determination and vigor — perhaps Germany's answer to Thomas J. Watson, though he prefers to be compared with Digital Equipment Corp.'s Kenneth Olsen.

A born entrepreneur, he first took an interest in computing at the Univeristy of Frankfort in 1947, where he studied physics and from where he also graduated in business administration. He had a private mentor in Dr. Walter Sprick, a Paderborn teacher and later R&D chief at Univac and IBM. Nixdorf built his first computer in 1952 in a basement to collect the $750 needed to pay for Ph.D. exam fees. "But then I started getting so many orders," he reflected, that I never returned to the university to get that Ph.D."



Heinz Nixdorf

Nixdorf is sensitive to the fact that the firm cannot indefinitely rely on his leadership. "I have given thought to the question of the firm's future without its chief," he admitted. "In recent years, we have broadened and rejuvenated the top management team specifically to ensure for the future."

For the time being, however, there seems little likelihood of Nixdorf Computer having to do without its energetic chairman.

Memory Suppliers Recuperating After IBM 4300 Announcement

(Continued from Page 61)
there has been an increase of leasing and decline in purchase activity for add-on memory. At Storage Technology Corp. (STC), Don VerMeer, memory product manager, said there has been more demand for leases in the last six months than in the previous year.

While declining to reveal his firm's lease/purchase ratio, VerMeer did state that "our lease percentage has increased 10% and our purchase percentage dropped an equal amount." STC supplies add-on memory for IBM 370/158, 168 and 30 series machines.

But whether selling or leasing memory, independent suppliers maintain they can offer users a better deal than IBM or than third-party suppliers.

EM&M's Coppola said independents' prices typically are 50% lower than IBM's. For example, an initial megabyte of memory for a 370/158 costs $50,000 from his firm, compared with $75,000 from IBM. Discounts increase as more memory is added, often because the first megabyte includes the price of the cabinet that houses it. On the 158, IBM charges $150,000 for 2M bytes while EM&M's tag is $75,000.

Used Memory Prices

Cambridge claims not only to sell add-on memory for less than IBM, but also to beat used memory prices, at least for the 370/158. The company charges $49,500 for the first megabyte, while used 158 memory is currently going for 90% of new, or $65,000, one dealer said.

One reason for the high used memory price is that 158s are in short supply. Users of the 158 who are awaiting the "H" series are holding on to their machines instead of moving up to 30 series processors, according to Kent Crombie, Cambridge's director of computer systems marketing. Industry sources said the price of used 158s has increased 25% in the last 30 days.

Besides lower purchase prices, independents claim to offer users more flexible lease terms, smaller memory increments and better delivery than IBM.

While EM&M typically looks for one-year minimum leases, Coppola said the company will go to as low as one-month terms for existing systems of customers who plan further upgrades. This compares with IBM's 30-day rental plan and four-year lease plan on 370 equipment.

Independents also allow users to add more memory, suppliers said. IBM is said to limit the amount of memory it will sell to add to its machines to enourage purchasing larger systems.

For example, IBM will not take the 370/168 above 8M bytes, whereas National Semi will offer users up to 16M bytes of memory. "Most large 370 users are adding teleprocessing networks to meet the need for more throughput," Siehl said. "And by going to larger memory sizes, they can reduce the amount of paging necessary in virtual memory systems to increase response time.

Another plus for the independents is faster delivery. While IBM offers between 12- and 24-month delivery for add-on memory, independents typically offer between 30-day and 60-day turnaround.

Add-On for 30 Series

Despite a rosy outlook for the independent market for 370 add-on memory, most suppliers were less enthusiastic about the 30 series add-on market. Demand is soft for 3031 and 3032 processors because of "H" series speculation and because many alternative systems, such as from Amdahl Corp. and Itel Corp., are available, Crombie said.

Because fewer alternatives to the 3033 exist, that market is stronger. Also, users aren't afraid to commit to the 3033 since the "H" series is expected to come in initially at the CPU power rating of a 3033, EM&M's Coppola said.

Noting that the 3033 "gobbles up memory," Crombie indicated Cambridge is in the process of Beta testing 3033 add-on memory for availability in September at $98,000 for 2M bytes and $180,000 for 4M bytes.

Bleaker still than the 3031 and 3032 add-on market, however, are prospects for a 4300 add-on memory business. "We're not sure we can provide a product competitive in performance and with IBM's $15,000 per megabyte price," Cappola said.

Noting that 4300 users will not require large amounts of memory, STC's VerMeer lamented that "trying to sell 2M-, 3M- or 4M bytes at $10,000 per megabyte is just not worth it."

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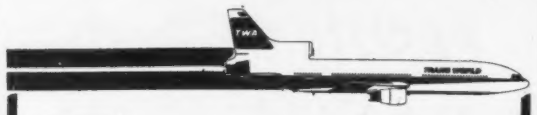
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MANAGER SYSTEMS DEPARTMENT

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- **Systems Analysts**

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Strong creative design and communications skills required. Business systems and COBOL experience are required. Experience with data base systems (DL/I, IDMS, TOTAL, etc.) desirable.

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Degree or equivalent required with 3 or more years development experience . . . preferably in data base systems. Good communications skills a must. Familiarity with Information Systems Planning helpful.

Please send resume or details of your background including salary history to Thomas E. Leigh, Dept. CW-820, ITT Federal Electric Corporation, Box 1886, Vandenberg AF Base, California 93437.

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1211 NORTH WESTSHORE BOULEVARD
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PROGRAMMER/ANALYST

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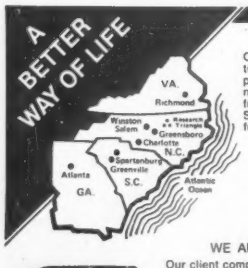
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This area provides early definition and design of future microcomputers in communications products along with initiation, early program management, and startup development of new programs. This group offers opportunities for individual contributions in a systems level scope of design from the conceptual stage to finished product. We require senior analysts with a minimum of 5 years in software plus knowledge of hardware in any one of the following areas: • Microcomputer Design • Communications Product Design • Communications Network Architecture • Systems Modeling Performance Measurement and Analysis.

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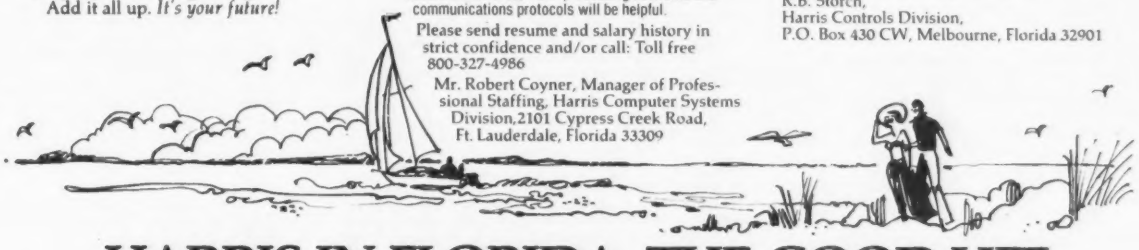
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Send resume including salary history, in confidence, to: Dorothy I. States, HONEYWELL INFORMATION SYSTEMS, MS-466, 200 Smith Street, Waltham, MA 02154.

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The Educational Computing Network, service of the Illinois Educational Consortium is seeking to fill the position of Systems Programmer. The Illinois Educational Consortium is a not-for-profit corporation whose purpose is to support and advance the collective activities of institutions of higher education in Illinois.

The systems programmer is responsible for the correct functioning of the operating system, utility programs, other proprietary software and to provide technical assistance to other functional areas of the organization.

Applicants should have one or more years of practical systems programming experience with Control Data 6000 or Cyber systems, an understanding of Kronos and or NOS operating systems and Compass, and an ability to present technical material clearly and effectively. ECN currently provides academic computing services to the 9 State Universities which comprise the membership of the Mid-Illinois Computer Cooperative with a Cyber 170-730 NOS system.

Salary commensurate with experience plus excellent fringe benefits. Forward resume with salary history to:

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Executive Director
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Cottonwood Office Center
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The Ames Laboratory, Iowa State University, has an immediate opening for the position, Manager of Computation Services.

The Ames Laboratory is a multiprogram laboratory of the U.S. Department of Energy, located on the Iowa State University campus. It has a staff of 610 scientists and support personnel, and an annual budget of $14 million. The Laboratory's activities range from fundamental research in the physical sciences to applications programs in energy, materials, and environmental sciences. The Laboratory's close association with Iowa State University assures a high degree of technical competence and opportunities for personal growth.

The person selected will be responsible for management and direction of all phases of the newly created Computation Services Area of the Laboratory, including a medium to large-scale central facility and programming/consultation services in support of a wide variety of scientific research. Responsibilities will include determination and evaluation of user needs, planning, acquisition and operation of appropriate hardware and software resources, recruiting and selection of computer-related personnel, and collaboration with the scientific staff on research activities that involve computers.

Applicants must have a thorough knowledge of computers, computer systems, scientific applications of computers, and must have demonstrated management/supervision abilities. An M.S. degree in Computer Science, or equivalent experience, is required, plus six years of progressive, professional computer experience. The latter must include at least two years experience directing the work of computer professionals.

A competitive salary (from $26,000) and comprehensive fringe benefit program are offered.

Inquiries, nominations, or applications with resume, names of three references, and salary history should be directed to:

Curtiss Roberg, Personnel Officer
Ames Laboratory

Iowa State University
Ames, Iowa 50011

tel # 515/294-2680

Application Deadline: 15 Oct., 1979

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Personnel Manager-Headquarters Facilities

JACK ECKERD DRUG COMPANY
P.O. Box 4689
Clearwater, Florida 33518

PROGRAMMING SUPERVISOR

Corporate headquarters of nation-wide service organization conveniently located in Chicago is looking for Supervisor familiar with IBM O/S systems. The ideal candidate will possess at least 3 years of heavy assembler language background, experience in directing the efforts of other programmers, be aggressive and results oriented, and operate comfortably in a user interface capacity.

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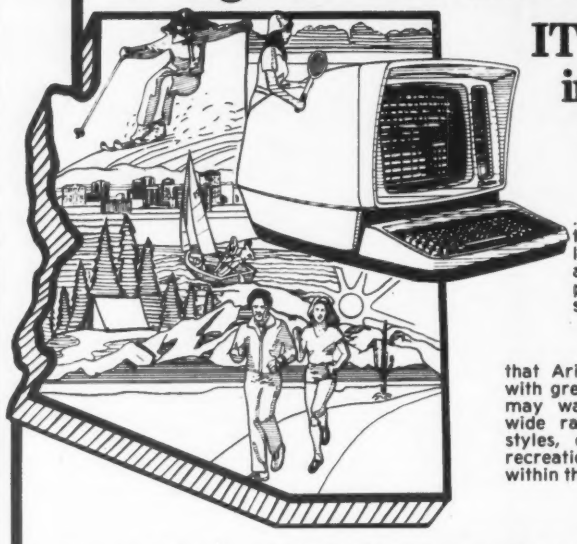
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To manage the growth of these companies, we are forming a new MIS staff at our headquarters in New York City. Its mission will be to install state-of-the-art manufacturing and financial systems at our affiliate companies. As a result, several key positions have been created on both our corporate and field operations staffs for qualified EDP professionals to help us meet the growing demands:

Senior Systems Analysts
These positions call for at least 3-7 years' experience including in-depth knowledge of financial and/or manufacturing applications. Minicomputer and real-time experience considered a definite plus.

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These positions require 1-5 years' experience designing and/or programming financial and manufacturing applications in an interactive minicomputer environment. HP-3000 experience is highly desirable.

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We require at least 1-3 years' experience in financial modeling and planning. Will work with corporate systems staff in the development of modeling for financial plans. Must be accustomed to heavy interface with management.

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These positions call for at least 1-3 years' experience in the installation and support of HP-3000 computers in an interactive distributed computing environment.

All positions require a Bachelor's degree with MBA or MS preferred. The successful candidates will have the opportunity to participate in the implementation of integrated business systems for our HP-3000 network.

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These are outstanding career opportunities in a stimulating, diversified business environment. We are prepared to offer highly competitive salaries, including excellent benefits and company paid relocation.

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Join the world's fastest growing computer company with sales up 49% in 1978, the highest growth rate in the Fortune 500.

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As an EDP Auditor for Marine Midland, you would conduct audits of complex financial systems and data centers in a highly sophisticated multi-IBM 370/168 environment.

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The selected individual will be responsible for the installation and Maintenance of IBM systems software, particularly OS/VSI, CICS/VS, VSAM and VTAM. This position is also responsible for developing hardware configurations, performance analysis and capacity planning.

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Please send your resume including salary history to Fred C. Deraney, 871 South Nash Street, Suite 300, El Segundo, CA 90245. Or, call (213) 640-1830. We are an equal opportunity employer m/f.

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These positions are responsible for controlling and supervising activities for each project/projects within the specific dept. Responsibilities include development of project plans and schedules; establishment of work assignments and technical direction for the following positions.

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Under general supervision will develop, enhance and maintain software for projects within the support software dept. Will provide solutions to a variety of problems following established procedures and guidelines.

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Will gather and analyze information for developing and modifying computer systems, define system objectives, system operation and develop system test and conversion plans.

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Responsible for projects involving the continued development of real-time multiprogramming operating systems, performance measurement/evaluation, multiprocessor software, data base access methods, text editing and systems software utilities.

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Responsibilities for physical planning and hardware implementation support for the development facilities and clients. Will define and document site environmental requirements, evaluating, testing and documenting new equipment added to the hardware configuration.

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Will supply the technical skills needed for customer services, manufacturing and installation applications, includes bench testing and fault isolation of sub-assemblies to component level.

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SYSTEMS PROGRAMMER
immediate opening

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Dr. S.C. Mathur, Director, Computer Center
UNIVERSITY OF LOWELL
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Must have hands-on network troubleshooter experience with a working knowledge of MODEMS, Network configurations, and IBM protocols. Programming experience very helpful.

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We currently have opportunities for results-oriented people to fill several challenging positions.

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Individual will be responsible for Stop & Shop's current and future Distributed Processing efforts. Management responsibilities include staffing, budgeting, planning, providing technical support, and supervising 8-12 people. Interested candidates must have strong T.I. 960 expertise and managerial experience.

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Programmer Analysts will furnish technical and operational support of our current Texas Instruments 960 and DXS computer systems. Applicants must have strong T.I. 960 assembly language background, have good analytical skills in planning and developing on-line projects, and be able to communicate with end-users.

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Stop & Shop is seeking professional System Programmers to join our Technical Support staff in support of our IBM 370/158 and 370/145 installation. You will be responsible for the installation, support, and enhancement of our 370's using VS1, VM/CMS, and IMS. Internals experience with one or more of these systems is highly desirable. Future plans include evaluating the upgrading to MVS.

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The successful applicant must have a knowledge of services offered by the telephone company to serve as our Voice Communications Analyst. Experience with Centrex, WATS, Tie Lines, Direct Dial, and Tell Network is a must. Candidates should be familiar with the Key Sheets used by the telephone company and should have a general knowledge of tariff filings and rulings.

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MS. CAROL K. COMBS
PERSONNEL REPRESENTATIVE
INFORMATION SYSTEMS DIVISION
The Stop & Shop Companies Inc.
P.O. Box 369
Boston, MA 02101

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You'll be responsible for overall performance and capacity management. We prefer someone already successful in managing a complex 303X and MVS environment. You must be capable of establishing and maintaining highly responsive timesharing, on-line DB/DC, as well as batch services.

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Be responsible for a wide variety of services in our large data center. You must have experience in applications programming and extensive knowledge of major computer languages including MVS, JCL, and TSO. This position acts as a liaison between users and the data center.

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In this position you'll be responsible for our nationwide data communications network. We expect you'll have experience with RJE, TSO and DB/DC systems. Exposure to SNA is a plus. You must also be highly proficient in telecommunications control center activities and equipment as well as be able to deal with common carriers.

Basic qualifications for these positions include extensive practical experience in large scale IBM MVS computer systems with multiple 303X or 168/158 systems. You must also possess a degree related to one of these areas. An advanced degree is always a plus.

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We require a background in programming with experience in financial systems, on-line systems with emphasis on use of intelligent terminals, or data base management technology. Some previous project leadership, knowledge of TOTAL, or experience with CDC CYBER 70 Series computers would be helpful.

We offer excellent working conditions, opportunity for advancement, and a fringe package which includes 4 weeks paid vacation.

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ATTN: Fran Bonello

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A "Leader" in the Communications Field currently seeks qualified Programmers and Programmer Analysts to help them design Data Support Systems for their corporate logistics model. The position will entail travelling to user locations, analyzing their requirements, detailed systems design, writing up complete specifications for Programmers, and writing documentations.

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If you possess a solid technical background and meet these qualifications, we would like to talk with you. We offer an excellent benefit program and very competitive salary commensurate with experience.

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Knowledge of insurance or financial accounting, coupled with expertise in COBOL, DOS/VS and VSAM a must with CICS a plus.

We offer competitive salaries, excellent working conditions, and a fully paid benefits package.

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MR. VINCENT KENNY
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Amdahl, Bank, P/A	25K
Analyst, System/3	25K
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DP Mgr, System/34	22K
370 Prog/Analyst	22K
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Pennsylvania House, Division of General Mills Inc., a leader in high quality furniture, has openings in our fast growing D.P. shop. Opportunity to work in an IBM 370-138 and data base environment installing complex business systems.

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Will design and implement new systems and ensure proper scheduling and development of other analysts. 3-5 years business experience preferred.

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Utah State University

Programmer/Analyst

Full time 12 month position. Prepare logic flow charts for the solution of business problems. Determine equipment requirements for programmers. Generate test data and debug programs. Assist in documentation and evaluation. BS in Computer Science or related area required. 2 years experience in programming and knowledge of ANSI COBOL necessary. Submit resume and names of 3 references by September 3, 1978 to: Floyd Burnett, UMC 37, Utah State University, Logan, Utah 84322. An equal opportunity/affirmative action employer.

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(609) 546-6300

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Certified Grocers is located in Ocala, Florida, a community of approximately 50,000 people. We are seventy-five miles north of Tampa and thirty-five south of Gainesville, and a short drive to either Daytona Beach or the Gulf Coast. Certified offers a complete fringe benefit package. Interviewing and relocation expenses are company paid. The positions offer attractive salaries and a unique opportunity to innovate in a high technology environment. For consideration, please forward your resume and salary history in strict confidence to:

Mr. Don Burt
Personnel Manager
Certified Grocers of Florida, Inc.
P.O. Box 1510
8305 S. E. 58th Avenue
Ocala, FL 32670

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We require a self-starter with 3-5 years experience programming RPG II and designing systems in a financial/ banking environment. System 3, Model 15, CCP experience a plus. Send resume and salary history to **Data Processing Dept., Box 1750, Poughkeepsie, NY 12601.**

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POSITION: Administrative Applications Specialist

STARTING DATE: Open

DEADLINE FOR APPLICATIONS: August 24, 1979

QUALIFICATIONS: College administrative computing experience is desired. The candidate should be familiar with information management methods used in administrative offices such as admissions, registrar, and alumni, etc. In addition, a good background in a programming language, such as BASIC, would be helpful.

Please send resume to Bates College Business Office, Lewiston, Maine 04240.

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Design and develop computer programs and/or utilize existing software package and components to retrieve, summarize, edit, and/or update and epidemiologic data base. Aid non programmers in using computer technology. Assist researchers by running programs and software packages.

Requirements: BS in computer science or related field; MS in computer science preferred. Experience in FORTRAN, COBOL, and/or Basic; IBM 360 JCL; an interactive operating system such as DEC's TOPS-10 or IBM CMS; and with a data base management system.

Send resume with references and salary history to:

Employment Office
OAK RIDGE ASSOCIATED UNIVERSITIES
P.O. Box 117
Oak Ridge, TN 37830

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SYSTEMS PROGRAMMERS
IBM OS/VS1/MVS

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Responsibilities include specification and support of systems software; development of backup and recovery procedures in a new processor installation; and optimization of the processing environment through the use of proprietary software packages and through operating system tuning.

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Jim Morgan
Employee Relations

ROLLINS, INC.
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Personnel Coordinator
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IPC
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Boston, MA 02110
(617) 423-1200

The School Board of Broward County, Florida

Data Base Administrator

Qualifications: Bachelor's degree and a minimum of seven years experience in the analysis, design, programming, and installation of data processing applications (three years of which must have been as a data base analyst). Familiarity with DL/1 is desirable.
Salary Range: $20,351 — $28,347

Systems Analyst

Qualifications: Bachelor's degree plus a minimum of five years experience (three in a supervisory capacity) in systems design, programming and implementation, plus a very high level of technical knowledge of Data Base Management Systems.
Salary Range: $18,965 — $26,417

Programmer/Analyst

Qualifications: Bachelor's degree plus a minimum of three years experience in systems design, programming and implementation.
Salary Range: $16,469 — $22,938

Deadline for Receiving Applications: September 10, 1979
Effective Date of Vacancies: Immediately
Submit Letters of Applications & Resumes to:
Mr. Fred Kauffman
Director of Data Management
The School Board of
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Florida International University, a dynamic multi-campus state university located in Miami, is seeking qualified systems analysts and systems coordinators. Applicants should have at least five years of systems analysis experience or an equivalent combination of education and experience. Benefits include paid vacation and sick days, paid holidays, health insurance and HMO plans, tuition free courses and many more. Please send resume and salary requirements to:

Florida International University
Office of Personnel Services
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Miami, FL 33199

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SYSTEMS ANALYST

This national corporation, a leading producer of reinforced plastic materials, has an immediate opening for a Systems Analyst. Individual should have at least 3 years of experience in systems analysis and good oral and written communication skills. Experience on System/3, CCP and RPG II, a definite plus. This is a high visibility position, offering primary responsibility for systems development and documentation, heavy user contact and project leadership responsibility.

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Western Area Supply Center
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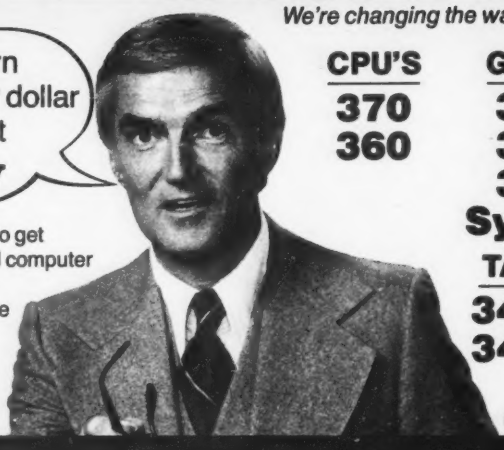
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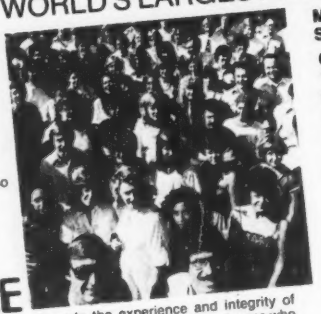
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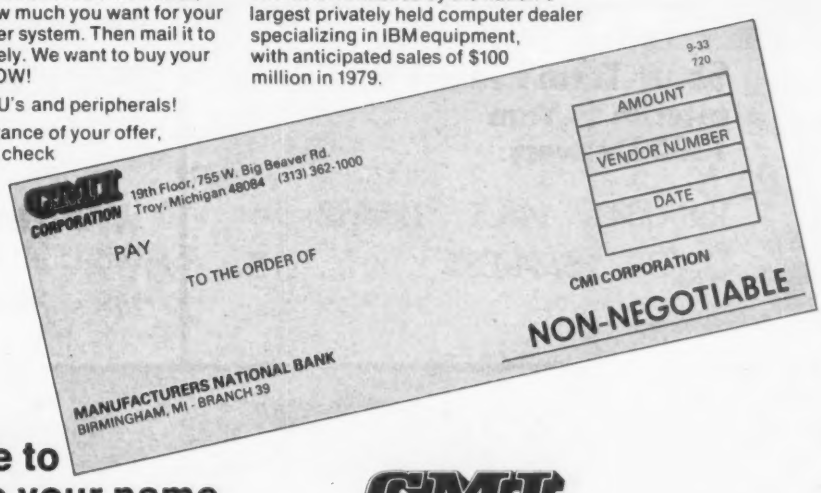
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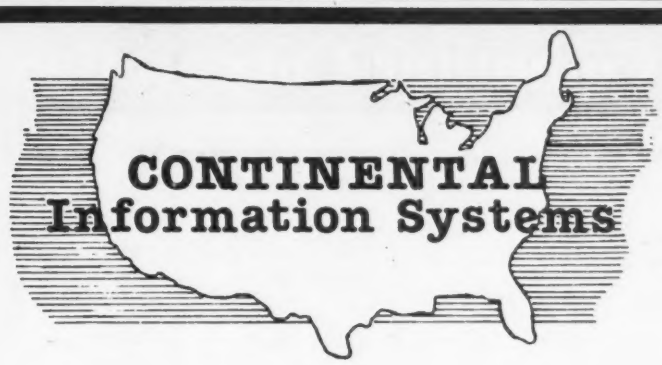
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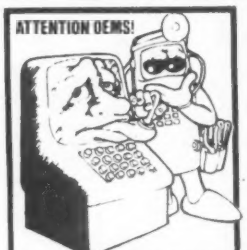
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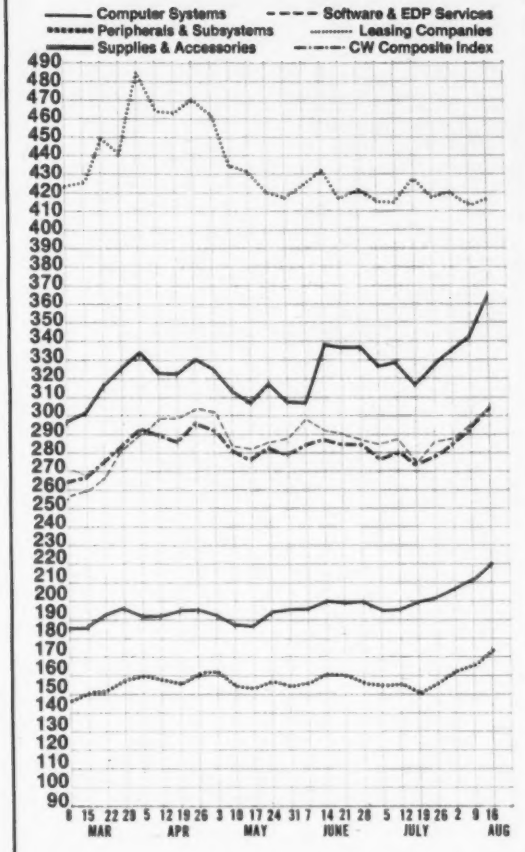
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Year Ended June 30

	1979 (000)	1978 (000)
Shr Ernd	$2.50	$2.17
Revenue	1,620,146	1,354,283
Earnings	178,275	151,122
3 Mo Shr	.89	.84
Revenue	435,200	358,983
Earnings	46,487	41,975

APPLIED MAGNETICS
Three Months Ended June 30

	1979	a1978
Shr Ernd	$.32	$.31
bRevenue	23,958,000	18,610,000
Tax Cred	...	c380,000
Earnings	1,449,000	1,317,000
9 Mo Shr	.90	.80
bRevenue	65,023,000	51,702,000
Spec Cred	350,000	588,000
Earnings	4,028,000	2,546,000

a-Restated. b-From continuing operations. c-From tax-loss carryforward.

AMDAHL
Three Months Ended June 29

	1979 (000)	1978 (000)
Shr Ernd	$.07	$.66
Revenue	86,500	73,900
Earnings	1,200	11,000
6 Mo Shr	.87	1.23
Revenue	144,000	137,700
Earnings	14,800	20,600

AUTOTROL
Three Months Ended June 30

	1979	1978
Shr Ernd	$.01	$.41
Revenue	7,088,880	6,550,104
Earnings	20,243	782,627
6 Mo Shr	.35	.74
Revenue	15,815,309	15,707,633
Earnings	660,147	1,413,120

BUNKER RAMO
Three Months Ended June 30

	1979 (000)	1978 (000)
Shr Ernd	$.78	$.67
Revenue	108,276	93,323
Earnings	5,001	4,244
6 Mo Shr	1.67	1.13
Revenue	214,024	179,153
Earnings	10,658	7,167

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 15, 1979

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		1978-79 RANGE (1)	CLOSE AUG 15 1979	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	23- 69	25	-2 1/2	-9.0
N	BURROUGHS CORP	59- 87	74 3/4	+3 5/8	+5.0
O	COMPUTER AUTOMATION	11- 44	12 3/4	- 1/4	-1.9
N	CONTROL DATA CORP	23- 48	48 1/4	+2 7/8	+6.3
O	CRAY RESEARCH INC	8- 39	36	+1 1/2	+4.3
N	DATA GENERAL CORP	42- 74	73 1/2	+6 1/8	+9.0
N	DATAPOINT CORP	34- 87	85 3/4	+7 1/2	+9.5
N	DIGITAL EQUIPMENT	39- 64	63 3/4	+4 1/8	+6.9
N	ELECTRONIC ASSOC.	2- 13	7 3/4	+ 3/4	+10.7
A	ELECTRONIC ENGINEER.	9- 19	13 1/2	+ 1/2	+3.8
N	FOUR-PHASE SYSTEMS	19- 46	37 5/8	+2 5/8	+7.5
N	FOXBORO	28- 44	42 3/4	- 1/8	-0.2
O	GENERAL AUTOMATION	7- 26	14 3/4	+2 1/8	+16.8
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	24- 49	54 3/4	+3 3/8	+6.5
N	HONEYWELL INC	43- 80	80	+5 5/8	+7.5
N	IBM	69-321	72 1/4	+2 7/8	+4.1
O	MANAGEMENT ASSIST	9- 29	21 1/8	+2 3/4	+14.9
O	MANUFACTURING DATA S	9- 31	30 3/8	+2 1/2	+8.9
O	MICRODATA CORP	10- 31	30 1/2	+ 7/8	+2.9
O	MINI-COMPUTER SYST	4- 8	3 3/4	- 1/2	-11.7
O	MODULAR COMPUTER SYS	7- 18	12 5/8	+1	+8.6
N	NCR	37- 80	80	+6 1/4	+8.4
N	PRIME COMPUTER INC	9- 22	19 1/4	+1 1/2	+8.4
N	PERKIN-ELMER	17- 34	30 3/8	+1 1/8	+3.8
N	SPERRY RAND	33- 52	51 3/4	+3 1/4	+6.7
A	SYSTEMS ENG. LABS	11- 24	14 7/8	+1 5/8	+12.2
O	TANDEM COMPUTERS INC	13- 37	32 1/2	+3 1/2	+12.0
A	WANG LABS.	6- 25	24 1/8	+2 3/4	+12.8

LEASING COMPANIES

O	HOOTHE COURIER CORP	13- 21	17 3/4	-1	-5.3
O	COMDISCO INC	3- 21	14 1/2	- 1/4	-1.6
A	COMMERCE GROUP CORP	1- 1	5/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 7	3 5/8	+ 3/8	+11.5
O	CONTINENTAL INFO SYS	4- 15	3 1/2	0	0.0
W	DATRONIC RENTAL	1- 4	2 3/8	0	0.0
A	DCL INC	3- 5	5 1/4	+ 1/8	+2.4
N	DPF INC	8- 14	10 1/4	+ 1/8	+1.2
N	ITEL	9- 36	9 1/8	+ 1/8	+1.3
N	LEASCO CORP	24- 49	48 1/2	+ 1/2	+1.0
O	LEASPAC CORP	1- 4	3/4	0	0.0
A	PIONEER TEA CORP	3- 7	3 1/8	0	0.0
N	U.S. LEASING	13- 20	16 3/8	- 1/8	-0.7

SOFTWARE & EDP SERVICES

O	ADVANCED COMP TECH	1- 2	1 3/8	0	0.0
O	ANACOMP INC	8- 22	17	+ 3/4	+4.6
A	APPLIED DATA RES.	8- 17	9 7/8	+ 1/2	+5.3
N	AUTOMATIC DATA PROC	24- 36	35 7/8	+ 7/8	+2.5
O	COMPU-SERV NETWORK	5- 16	13	+ 1/4	+1.9
O	COMPUTER HORIZONS	1- 9	3 1/2	0	0.0
O	COMPUTER NETWORK	5- 16	8 1/4	+ 3/8	+4.7
N	COMPUTER SCIENCES	8- 17	17 3/8	+2 1/8	+13.9
O	COMPUTER TASK GROUP	1- 7	6 3/4	+ 1/2	+8.0
O	COMPUTER USAGE	2- 6	2 1/8	- 3/8	-15.0
O	COMPUT AUTO +EP SVC	4- 18	7	0	0.0
O	COMSHARE	8- 26	16 3/4	+1 1/2	+9.8
O	CULLINANE CORP	14- 33	24 3/4	+1 1/4	+5.3
O	DATA DIMENSIONS INC	2- 9	2 5/8	- 1/4	-8.8
O	DATATAB	1- 4	2 3/8	- 3/8	-13.6
N	ELECTRONIC DATA SYS.	15- 25	24	+1 3/4	+7.8
O	INSYTE CORP	1- 3	1 1/2	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3	0	0.0
O	KEANE ASSOCIATES	3- 6	4 3/4	+ 1/8	+2.7
O	KEYDATA CORP	1- 4	3 3/4	+ 1/4	+7.1
A	LOGICON	10- 19	15 3/4	+ 3/8	+2.4
O	NATIONAL DATA CORP	7- 16	15 5/8	+2 3/8	+17.9
A	ON LINE SYSTEMS INC	12- 38	23 3/4	0	0.0
N	PLANNING RESEARCH	4- 10	6 3/4	0	0.0
O	PROGRAMING & SYS	1- 1	1 1/8	- 1/8	-10.0
O	RAPIDATA INC	3- 7	5 3/8	+ 1/2	+10.2
O	REYNOLDS & REYNOLD	14- 36	28 1/2	+2	+7.5
O	SCIENTIFIC COMPUTERS	3- 9	7 1/8	+ 5/8	+9.6
N	TYMSHARE INC	18- 43	43	+3 1/8	+7.8
A	URS SYSTEMS	5- 8	6	- 1/8	-2.0
N	WYLY CORP	1- 7	6	+ 1/4	+4.3

PERIPHERALS & SUBSYSTEMS

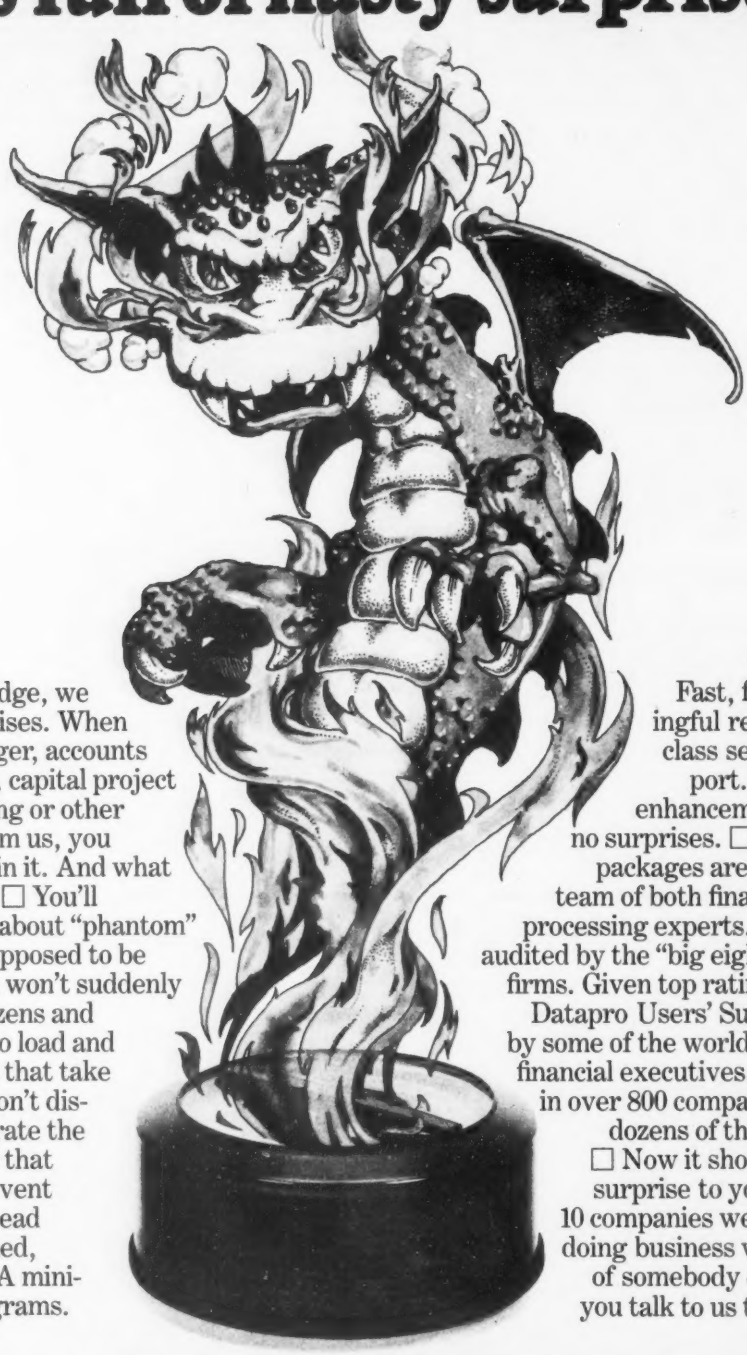
N	ADDRESSOGRAPH-MULT	13- 32	18 3/8	+1 3/8	+8.0
N	AMPEX CORP	10- 19	18 3/4	+3 1/2	+22.9
O	ANDERSON JACOBSON	5- 18	18 3/8	+ 5/8	+6.4
N	APPLIED DIG DATA SYS	8- 22	8 1/8	- 1/8	-1.5
O	BEEHIVE INT'L	3- 7	5	+ 1/4	+5.2
A	BOLT-BERANEK & NEW	6- 14	13 7/8	+ 1/4	+1.8
O	BUNKER-RAMO	10- 20	25 1/2	+1 5/8	+6.8
A	CALCOMP	3- 13	12 5/8	+ 5/8	+5.2
O	CAMBRIDGE MEMORIES	2- 9	2 3/8	- 1/4	-9.5
N	CENTRONICS DATA COMP	16- 52	49 7/8	- 3/8	-0.7
O	COGNITRONICS	1- 4	2 1/4	0	0.0
O	COMPUTER COMMUN.	6- 10	9 1/4	+ 3/4	+8.8
O	COMPUTER CONSOLES	4- 16	13 3/4	+1 1/4	+10.0
A	COMPUTER EQUIPMENT	3- 6	4 7/8	- 1/8	-2.5
O	COMPUTER TRANSCEIVER	1- 5	4 1/4	+ 5/8	+17.2
O	COMPUTERVISION CORP	9- 35	33 3/4	+1 5/8	+5.0
N	CONRAC CORP	14- 26	18 3/8	+ 3/8	+2.0
A	DATA ACCESS SYSTEMS	8- 10	9 3/8	- 1/2	-5.0
A	DATA PRODUCTS CORP	13- 25	17 3/8	- 3/8	-2.1
O	DATUM INC	2- 6	2 7/8	0	0.0
O	DECISION DATA COMPUT	2- 6	4	+ 1/8	+3.2
O	DELTA DATA SYSTEMS	1- 1	3/4	0	0.0
A	DOCUMATION INC	6- 34	25 1/4	+1	+4.1
O	DATARAM CORP	6- 32	21 1/4	- 1/4	-1.1
N	ELECTRONIC M & M	3- 9	4	+ 1/8	+3.2
O	FABRI-TEK	1- 2	5/8	+	+10.0
O	GENERAL COMPUTER SYS	1- 3	2 7/8	+ 1/4	+9.5
O	GENERAL DATACOMM IND	9- 21	17	- 1/4	-1.4
N	HAZELTINE CORP	10- 18	17	- 3/4	-4.2
N	HARRIS CORP	17- 36	33 1/4	+4 5/8	+16.1
O	INFOREX INC	4- 11	4 1/2	0	0.0
O	INFORMATION INTL INC	7- 12	9	+ 1/4	+2.8
O	INFOTON	1- 3	3	+ 1/4	+9.0
O	INTEL CORP	28- 57	56 3/4	+4 1/4	+8.0
O	INTERSIL	7- 19	17	+1 5/8	+10.5
A	LUNDY ELECTRONICS	4- 8	7	+ 3/8	+5.6
O	MSI DATA CORP	7- 19	8 3/4	+1 3/4	+25.0
N	MEMOREX	27- 59	30 1/2	-2 1/4	-6.8
N	MOHAWK DATA SCI	6- 15	14 1/2	+2 1/4	+18.3
O	OMEX	2- 8	6 1/2	0	0.0
O	PARADYNE CORP	9- 18	18 1/8	+1 3/8	+8.2
O	PENRIL CORP	5- 12	11 3/4	- 1/2	-4.0
N	PERTEC CORP	8- 17	11 7/8	+ 7/8	+7.9
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	RECOGNITION EQUIP	6- 13	7	+ 1/4	+3.7
O	SCAN DATA	1- 5	2 1/8	+ 1/4	+13.3
N	STORAGE TECHNOLOGY	15- 46	19 3/8	+2 5/8	+15.6
O	T BAR INC	11- 22	19 1/4	+1 1/2	+8.4
O	TALLY CORP.	4- 14	12 3/4	0	0.0
A	TEC INC	6- 13	8	- 1/8	-1.5
N	TEKTRONIX INC	33- 59	58 5/8	+1 3/8	+2.4
N	TELEX	3- 9	5	+ 1/2	+11.1
O	TESDATA SYSTEMS CP	9- 26	10	- 3/4	-6.9
O	WILTEK INC	1- 2	5/8	0	0.0

SUPPLIES & ACCESSORIES

A	AMERICAN BUS FRODS	8- 11	10 1/4	+ 1/2	+5.1
O	BALTIMORE BUS FORMS	1- 4	3/4	0	0.0
N	BARRY WRIGHT	14- 34	19	+ 1/2	+2.7
O	CYBERNATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	13- 30	26 1/4	+ 5/8	+2.4
N	ENNIS BUS. FORMS	5- 21	28 5/8	+1 1/2	+7.8
N	3M COMPANY	43- 66	57 5/8	+2 7/8	+5.2
O	MOORE COMP LTD	26- 34	32	+ 3/4	+2.3
N	NASHUA CORP	18- 37	29 1/4	+3 1/4	+12.5
O	STANDARD REGISTER	26- 29	24 1/4	+ 1/4	+0.8
A	TAB PRODUCTS CO	8- 16	15 3/4	+1 7/8	+13.5
A	WABASH MAGNETICS	10- 22	16 7/8	+ 1/8	+0.7
N	WALLACE BUS FORMS	18- 33	27 7/8	+ 7/8	+3.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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